

# **IoT Based Safety Gadget for Child Safety Monitoring & Notification**

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*Submitted By*

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**COMPUTER SCIENCE AND ENGINEERING**

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**ANNA UNIVERSITY: CHENNAI 600 025**

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## **1. INTRODUCTION**

### **1.1 Project Overview**

In our nation, children are the most precious resources as they are imminent of an country. The parents always look forward to having their children in a safeguarded place where they can make their time without any complication. Unluckily children are threatened. So this project over

come the problem of continuously monitoring the without any fear the child.If the move out of the geo fence location the notification is send to the parent.It also say the location in the geofence or not.

We going to create the project using IBM cloud services using IBM Watson IoT Platform ,Node-RED Service ,Cloudant Data Base.And also we going to use python.Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geo fence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.

This web application that going to monitoring the child repeatedly and send the notification to the parent web or application.It going to send the message if the is within or without the geo fence location It also repeatedly tracking and send the information in to the database.

## **1.2 Purpose**

The Tracker is an intelligent application that ultimately aims for the prevention and protection against child abuse and to ensure their safety and security; especially for the school going ones. The most important part of the proposed system is a smart watch that ensures the safety .The purpose of a child tracking device is to know where your child is at all times. This device can come in handy when it comes to missing children or in the event that your

child might be in danger. These systems provide information from general location updates to information about the child. A tracking device can be useful in case the parent feels that his/her child is in danger. Not only does the device provides the real-time location, but it also pinpoints those locations where the child presented.

This project focused on how parents can keep track their children movement to avoid child missing, kidnapping and etc. By using GPS as a tracking tool where it allows to determine the exact location (longitude and latitude) of the children. Every an hour, the location of the children will be recorded in the system to keep track the children. tracker made using trailblazing technology, to keep your precious ones safe and secure when they are away from you. Tracker uses a secure private cloud platform to store the location data of your kids. With cloud security, you'll not have to worry about any problem.

## **2. LITERATURE SURVEY**

### **2.1 Existing problem**

- The existing devices use Bluetooth and Wi-Fi for communication. As these two technologies cover only a short range, the communication over the far area .
- In the existing devices ,the devices that monitoring location and send the information to the parent,but it not say where the child preented in the are of geofece or not.
- Android terminals have wireless LAN and Bluetooth device. It results in lack of individual attention towards the children. It offers less security .

- Less in the security to monitoring the devices.

## 2.2 References

1. Child Safety Wearable Device (IEEE 2017, Akash Moodbidri, Hamid Shahnasser).
2. End to end safety solution for children enabled by a wearable sensor vest (Journal of Ubiquitous Systems & Pervasive Networks, 2015, Mirjami Jutilaa, Pekka Karhulab).
3. B. Dorsemayne, 1. P. Gaulier, 1. P. Wary, N. Kheir and P. Urien, "Internet of Things: A Definition and Taxonomy," Next Generation Mobile Applications, Services and Technologies, 2015 9th International Conference on, Cambridge, 2015, pp. 7277.
4. WSN/RFID architecture for children monitoring (Real-Time Systems and Networks Laboratory Kore University of Enna, Giovanni Pau, Gianfranco Scata ). Implementation of child tracking system using mobile terminals (International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), 2015).
5. H. Moustafa, H. Kenn, K. Sayrafian, W. Scanlon and Y. Zhang, "Mobile wearable communications [Guest Editorial]," in IEEE Wireless Communications, vol. 22, no. 1, pp. 10-11, February 2015.
6. Yuichiro MORI, Hideharu KOJIMA, Eitaro KOHNO, Shinji INOUE, Tomoyuki OHTA, and Yoshiaki KAKUDA, —A SelfConfigurable New Generation Children Tracking System based on Mobile Ad Hoc Networks Consisting of Android Mobile Terminals

- proposed in 2011 tenth International symposium on Autonomous decentralized system.
7. Reshma M. and Amruta K.M.—Survey on Different Technologies of Child Tracking System|| Proposed in 2010 International journal of computer technology.
  8. (Pawade & Gaikwad, 2015)Pawade, R. H., & Gaikwad, A. N. (2015). Android Based Children Tracking System, 4(6), 2088–2092.

## **2.3 Problem Statement Definition**

- 1) Increasing rate of child kidnapping.

According to News Strait Times Newspaper, of the 567 children, another 193 children are still missing and being investigated. A majority of cases were due to family problems, seeking freedom and running off with lovers or friends. (Bukit Aman CID (Investigations and Legal) deputy director Datuk Law Hong Soon, June 4, 2016)

- 2) Lack of tracking technology for child.

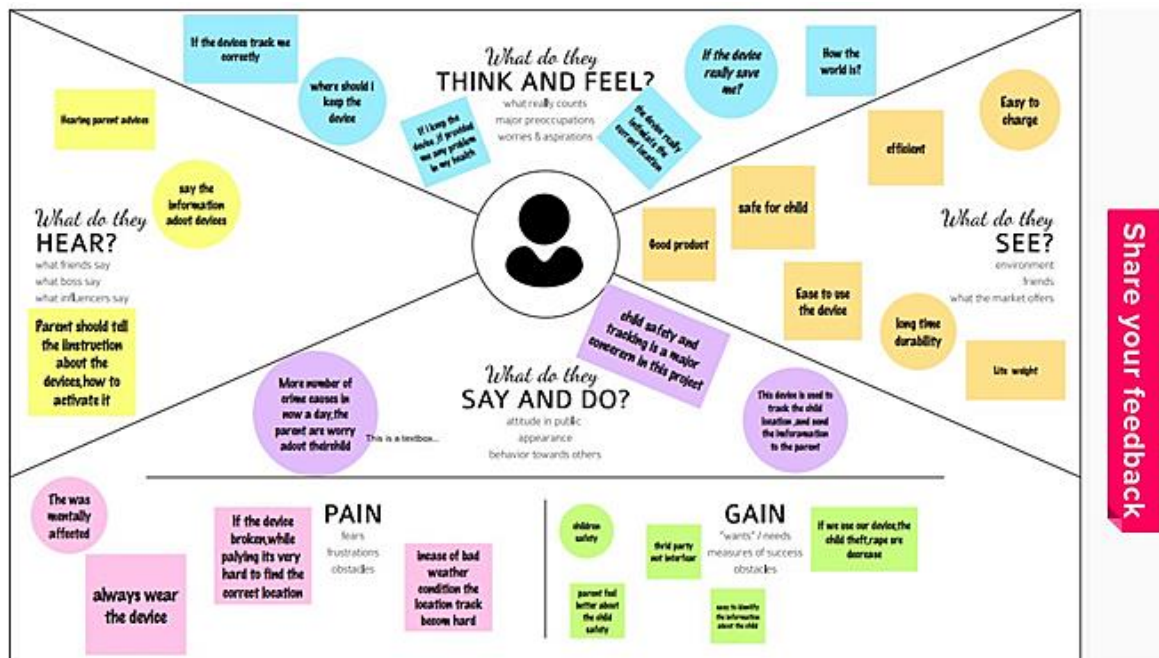
The parent is hardly to keep a watch on their child without the use of technology, especially when the child is in the outdoor. The parent even cannot avoid the negligence that will make by children in the future day.

- 3) Limited application for child monitoring.

There are very limited application available for tracking child when they are out of parents control and let kidnapping or missing cases occurred.


### 3. IDEATION & PROPOSED SOLUTION

#### 3.1 Empathy Map Canvas





## 3.2 Ideation & Brainstorming



### Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 3-4 people recommended

[Share template feedback](#)

#### Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

---

- Team gathering**  
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
- Set the goal**  
Think about the problem you'll be focusing on taking in the brainstorming session.
- Learn how to use the facilitator tools**  
Use the Facilitator Superpowers to run a happy and productive session.

[Open article](#)

#### 1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

How might we [your problem statement]?


Child & adult helps the parents to continuously monitor the child's location. They can simply wear their children at school or parks and create a geofence around the parents location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or carers. The entire location data will be stored in the database.

#### Key rules of brainstorming

To run a smooth and productive session

- Stay in topic
- Encourage wild ideas
- Defer judgment
- Listen to others
- Go for volume
- If possible, be visual

Cloud Services



```

graph LR
    IoT[IoT Device] --> Gateway[Gateway]
    Gateway --> Backend[Backend]
    Backend --> DB[(DB)]
    Backend --> UI[UI]
    Backend --> Cloud[Cloud]
    
```



2

## Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

### TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

**S.GulnasFathima.**

**Arun navameena**



**Muthulakshimi**

**Muthumeenakshi**



3

### Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

### BASED ON LOCATION

We can only view the last location of child

To know the children's location if they are missing

The issue is if the GPS data does not push to dashboard due to delay in satellite communication it creates big problem

Issue occurring in location not marked or mismatched to safety location

### BASED ON SAFETY

The issue is the parent does not know the panic situation of child

It affects the safety of the child and creates the panic to parent

The issue is when child crosses some safety location marked by parents, it wants to send message to parent, if location not mapped correctly problem occurs

In order to get the information about child safety works smoothly and accurately

It is important because the message has to be sent to parent when child goes to danger area

### Based on health

The device materials can vomit hazardous rays

Device heat may be affect the child

To know the heat information of the child

Child body temperature may be affect by devices temperature

Tip  
Add customer stories to help the story notes to make it more to find, create, organize, and categorize important ideas as shown within your board.

### BASED ON DATA

Data and information are not able to read or write

When the database crashes

To reduce interrupt to get correct information of the child

### BASED ON COMMUNICATION

The boundaries of the problem is delay in communication

If the communication between the child and parent may be disconnected by some problem

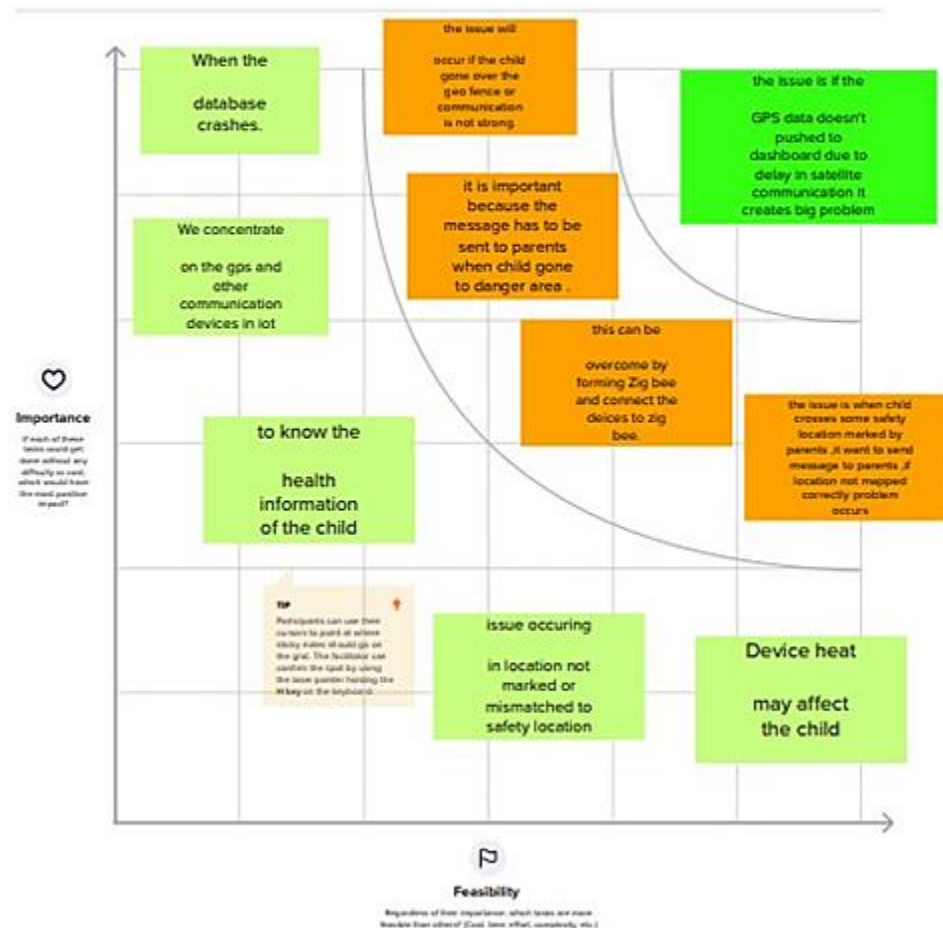
The issue is if the GPS data does not push to dashboard due to delay in satellite communication it creates big problem

4

### Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



## 3.3 Proposed Solution

The following information in proposed solution template is about proposed solution .

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geofence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or care takers. The entire location data will be stored in the database.
2.	Idea / Solution description	To improve the security services here, In this paper a system for children's safety is developed For children safety purpose
3.	Novelty / Uniqueness	The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during emergency.
4.	Social Impact / Customer Satisfaction	Improved safety index of place provides freedom for the children with special needs
5.	Business Model (Revenue Model)	Selling the product directly to the parent (Device + monthly subscription for the tracking and notification service. Selling the product to childcare center
6.	Scalability of the Solution	Scalability is one of the most crucial criteria you should look for when considering an enterprise IOT solution. When it comes to IoT, scalability isn't just about growing your deployment. It's impossible to scale IoT without also considering factors like security, cellular coverage, certifications, and your supply of devices.

### 3.4 Problem Solution fit

Define CS, fit into CC	<div>1. CUSTOMER SEGMENT(S)<div>CS</div></div> <div>Who is your customer? i.e. working parents of 0-5 y.o. kids</div> <div><ul style="list-style-type: none"><li>Our customers are the parents of the children who are all below the age of 16.</li><li>Handicapped and Microcephaly children and those who are facing Malnutrition are also our customer.</li></ul></div>	<div>6. CUSTOMER CONSTRAINTS<div>CC</div></div> <div>What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.</div> <div><ul style="list-style-type: none"><li>Power consumption is considerably low and mostly gadget use low power consumption equipments.</li><li>It use solar batteries to recharge addition with Lithium-Ion batteries.</li><li>The gadget can be available at affordable price.</li></ul></div>	<div>5. AVAILABLE SOLUTIONS<div>AS</div></div> <div>Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros &amp; cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking</div> <div><ul style="list-style-type: none"><li>Embed an best antenna in the gadget and reset router atleast every month to refresh for uninterrupted internet connection.</li><li>Substitute lowest cost material for manufacture.</li><li>Manage location services and using better GPS connection.</li></ul></div>	Explore AS, differentiate
	<div>2. JOBS-TO-BE-DONE / PROBLEMS<div>J&amp;P</div></div> <div>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.</div> <div><ul style="list-style-type: none"><li>whether the gadget has uninterrupted internet/GPS connectivity?</li><li>whether the gadget has ceaseless power supply?</li><li>what if the gadget causes health hazards to children?</li><li>can we buy the gadget with affordable price?</li></ul></div>	<div>9. PROBLEM ROOT CAUSE<div>RC</div></div> <div>What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.</div> <div><ul style="list-style-type: none"><li>Due to improper manufacturing of gadgets cause damage.</li><li>Violence against the children has increased due to the pandemic and multiple humanitarian crisis.</li><li>Mentally illness children can loss their way to their home.</li></ul></div>	<div>7. BEHAVIOUR<div>BE</div></div> <div>What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)</div> <div><ul style="list-style-type: none"><li>This gadget benefits and the usage make life easier.</li><li>Insecurity in children's mind will get vanished.  </li></ul></div>	Focus on J&P, tap into BE, understand RC
Identify strong TR & EM	<div>3. TRIGGERS<div>TR</div></div> <div>What triggers customers to act i.e. using their neighbour installing solar panel, reading about a more efficient solution in the news.</div> <div><ul style="list-style-type: none"><li>Getting information about the gadget from the official websites,advertisements in papers.</li></ul></div>	<div>10. YOUR SOLUTION<div>SL</div></div> <div>If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, how big is the risk and you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</div> <div><ul style="list-style-type: none"><li>Continuous surveillance of the children make their parents feel relief.</li><li>Handicapped children's location can be monitored.</li></ul><div>Pulse of the children will be monitored and actions will take according to that.</div></div>	<div>8. CHANNELS of BEHAVIOUR<div>CH</div></div> <div>8.1 ONLINE What kind of actions do customers take online? Extract online channels from #7</div> <div>8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</div> <div>Online: Installing sim in the gadget will allow us to access internet.so location can be access via sim cards.</div> <div>Offline: GPS service provide location access via connecting with the satellites.</div>	Identify strong TR & EM
	<div>4. EMOTIONS: BEFORE / AFTER<div>EM</div></div> <div>How do customers feel when they face a problem or a job and afterwards? i.e. feel insecure &gt; confident, in control - use it in your communication strategy &amp; design.</div> <div><ul style="list-style-type: none"><li>Before: parents may feel insecure once they face problems about their child security.</li></ul><div>After : parents may feel free and able to do their work without any worry.Insecurity will be vanished.</div></div>			

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement
FR-1	User Registration	Registration through Gmail Registration through phone number
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	App installation	Installation through link Installation through play store
FR-4	Settings geofence	Setting by user to find child location
FR-5	Detecting child location	Detecting location via app Detecting location via SMS
FR-6	User Interface	User Login Form. Admin Login Form.
FR-7	Database	Stored in cloud for seamless connectivity. Parents and kids link with the distance and the location values obtained from the mobile devices are stored here. The values include parent id, kid id, distance, longitude, latitude etc.

FR No.	Functional Requirement	Sub Requirement
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FR-8	Server	It connects the database and the frontend application. The backend server has been implemented to run as a service and is deployed in an IBM cloud instance. The backend server has been implemented to run as a service and is deployed in an IBM cloud instance.
FR-9	GPS tracking	The system is implemented with a GPS module, which acquires the location information of the user and stores it to the database.
FR-10	API	The value collected is sent to the database using an API.
FR-11	React JS	We are using ReactJS as frontend for our project. Node JS for the back end we are using NodeJS.
FR-12	GPS modules	It receives data directly from satellites.
FR-13	Battery Life	If the child or parent forgets to charge the device for a whole day then also the device will work. That's why we aim to make this device last the whole day with one charge. It should be long-lasting.
FR-14	Location History	The location history will help to track the child's activity so that the aren't will be updated. Location history will be there for 30 days. For example if the child gets missing with the help of location history the aren't can track down their child's activity and also can find their child.

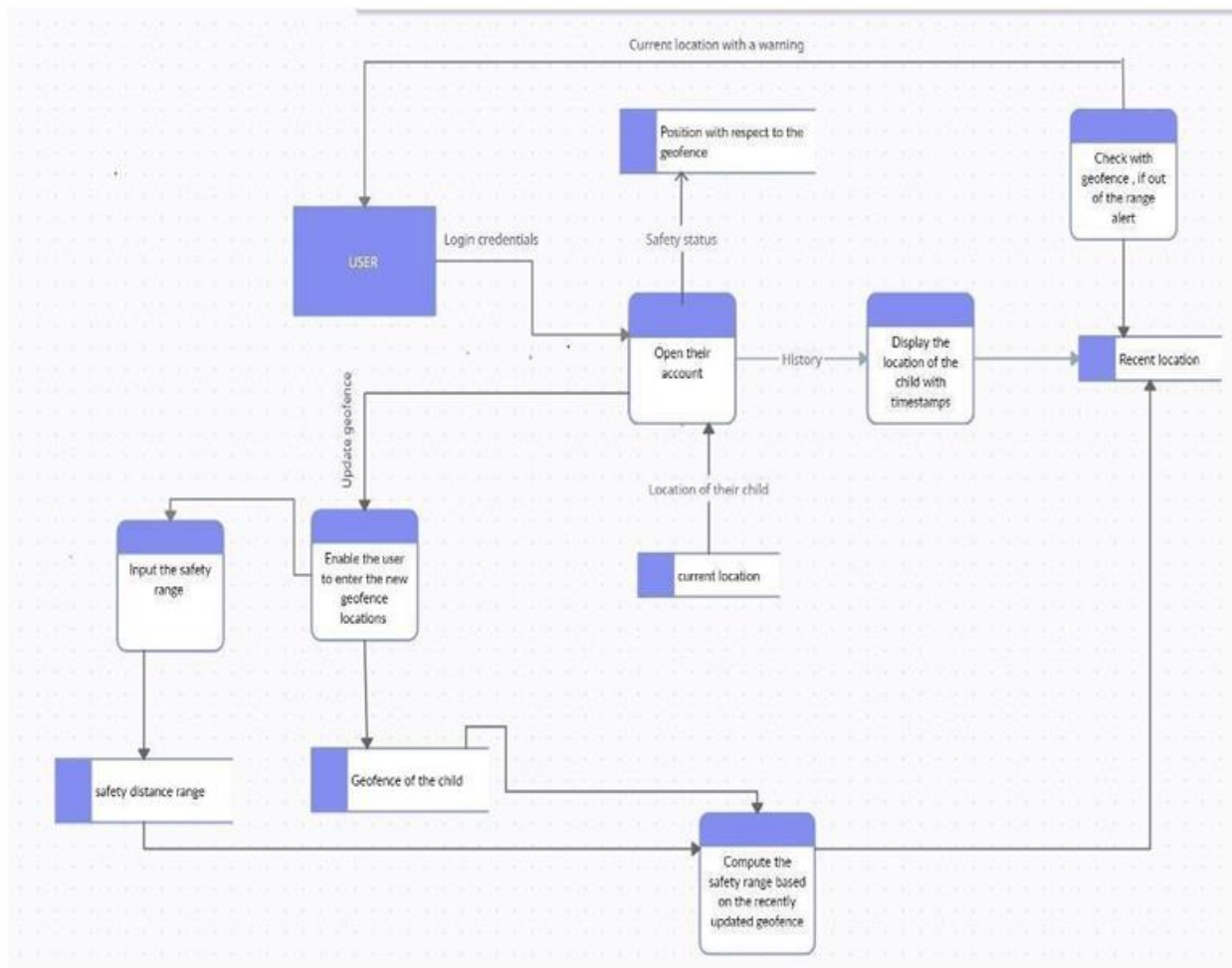
## 4.2 Non-Functional requirements

FR No.	Non-functional Requirements	Description
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NFR-1	Usability	Device have GSM can help to inform the parents or relatives about the current situations of the child by deliver the message immediately to save the child.
NFR-2	Security	Make children parents more assure abouttheir kid's security, we have a feature in our device called Geo-Fence. Whenever your child crosses that specific area, you will get an instant notification on your phone.
NFR-3	Reliability	Portable Easy to use Flexibility
NFR-4	Performance	Create a Child tracker which helps the parents with continuously monitoring the child's location. The notification will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.
NFR-5	Availability	Track your child even in a crowd Get travel details of kids at any time Know the current location.
NFR-6	Scalability	Gadget ensures the safety and tracking of the children. Parents need not worry about their children.
NFR-7	Evaluability	The system should be able to deliver promptly to the financing authority. In the case of non-profit organizations, the solution should be 'advancing the mission'.
NFR-8	Dynamicity	IoT devices may have the capability to adapt dynamically and change based on their conditions.
NFR-9	Desirability	Navigation should be made easy.The user should be able to search and find the information he needs without much hassle.

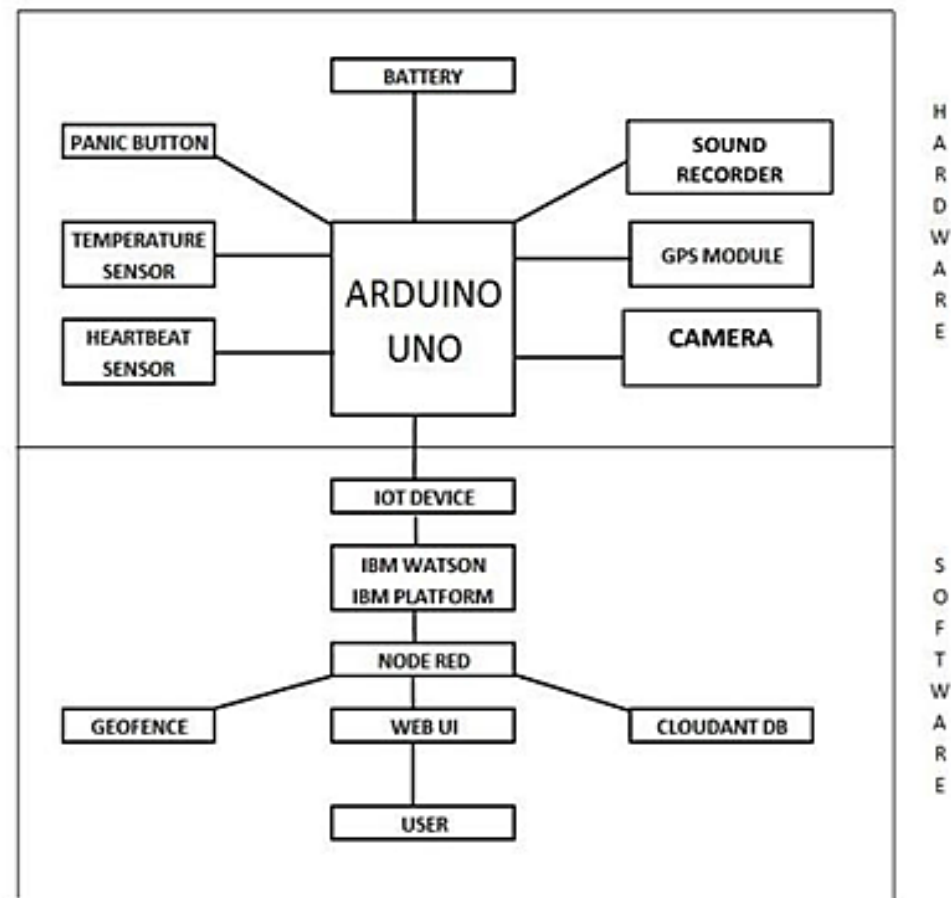
## 5. PROJECT DESIGN

### 5.1 Data Flow Diagrams



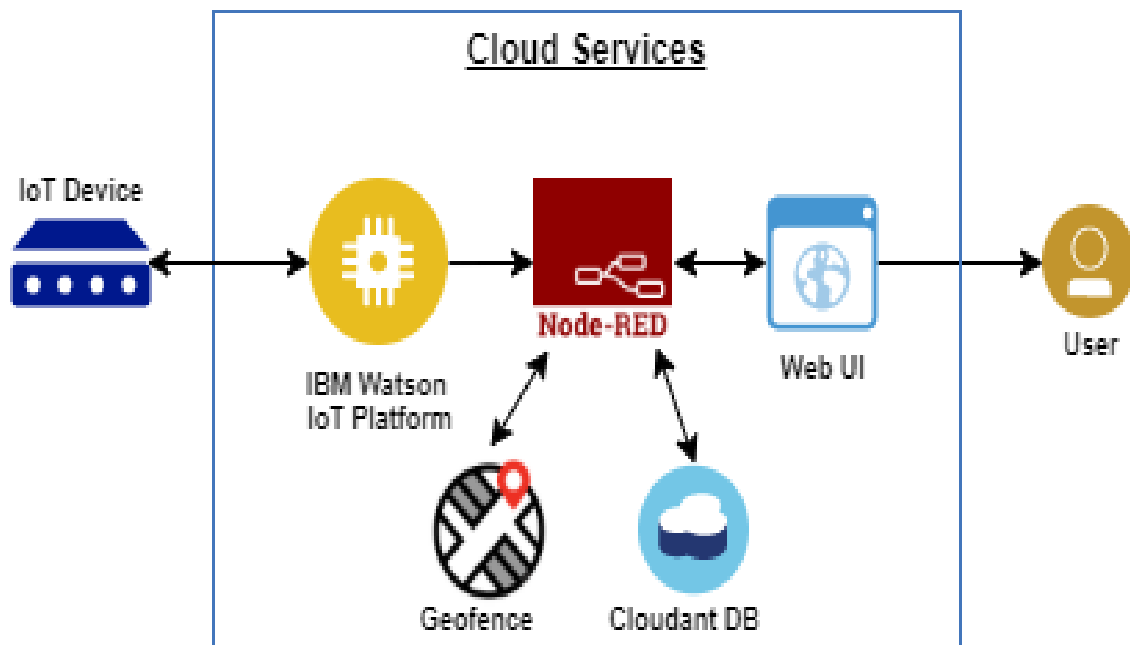
## 5.2 Solution & Technical Architecture

### Solution Architecture:



## Technical Architecture:

The IOT device that send the information to the Cloud Services. The cloud service that contain IBM Watson IOT Platform, Node Red and Web UI. The IBM Watson IOT Platform that send the information to Node Red services. The Node Red that collected the information for the Google map and send the message to cloudant DB to store the information in the Database. Then it move to Web UI then the user can see their thechild location.



### 5.3 User Stories

User Type	Funtional Requireme nt(Epic)	User StoryN umber	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)and (Web user)	Registration	USN-1	As a user, I can register my account by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email onceI have registered myself	I can receive confirmation email &click confirm	High	Sprint-1

		USN-3	As a user, I can register for the application through apple account	I can register & access the dashboard with appleaccount Login	High	Sprint-2
	Login	USN-4	As a user, I can log into the application by entering user id & password		High	Sprint-1
Administrator	Login		Maintaining and making sure the database containing the locations are secure and accurate and updated constantly.	I can login only with my provided credentials	High	Sprint - 3
Administrator	Login		Maintaining and making sure the database containing the locations are secure and accurate and updated constantly.	I can login only with my provided credentials	High	Sprint - 3

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Create and Configure IBM Cloud Services	USN-1	As a user I need to enroll the cloud registration	3	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-1		USN-2	As a user, I will create IBM cloud account.	2	MEDIUM	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M..MUTHU MEENAKSHI
Sprint-1		USN-3	After creating cloud account launch	5	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI

			IBM Watson IOT platform by accessing cloudaccount			
Sprint-1		USN-4	Create the node in IBM Watsonplatform	7	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-1		USN-5	After Creating node get device Type and id	1	LOW	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-1		USN-6	Simulate the node created	3	MEDIUM	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI

Sprint-2	Create and access Node-Red	USN-7	As a user ,I can create Node-red by app deployment	5	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-2		USN-8	Connect IBM Watson withnode red through APIkey	2	LOW	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-2		USN-9	Design the project flowusing Node-Red	7	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI

Sprint-2		USN-10	Check for the proper connections and the output in the node red application	3	MEDIUM	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
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Sprint	Functional Requirement(Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Create A Database in Cloudant DB	USN-11	Launch the Cloudant DB and Create database to store the location data	4	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-3	Develop the Python script	USN-12	Install the python software	2	LOW	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-3		USN-13	Develop the python scripts to publish details to IBM IoT Platform	6	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI



Sprint-3		USN-14	Integrate the device id, authentication token in python script	2	LOW	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-3		USN-15	Develop the python code for publishing the location (latitude & longitude) to IBM IoT Platform	8	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI

Sprint-4	Create the Web application using Node Red	USN-16	Develop the Web application using Node red	5	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-4		USN-17	Connect to the IBM IoT Platform and get the location and Store the data in the Cloudant	2	MEDIUM	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-4		USN-18	Create the geofence and Google map for location identification	8	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI

Sprint-4		USN-19	Integrate the geofence and Google map to check if the child is inside or outside the geofence	11	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI
Sprint-4		USN-20	Send the notifications if the child is outside the geofence	4	HIGH	S.GULNAS FATHIMA A.ARUNNAVAMEENA G.MUTHULAKSHMI M.MUTHU MEENAKSHI

## 6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date(Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	21	6 Days	24 Oct 2022	29 Oct 2022	21	29 Oct 2022
Sprint-2	17	6 Days	31 Oct 2022	05 Nov 2022	17	05 Nov 2022

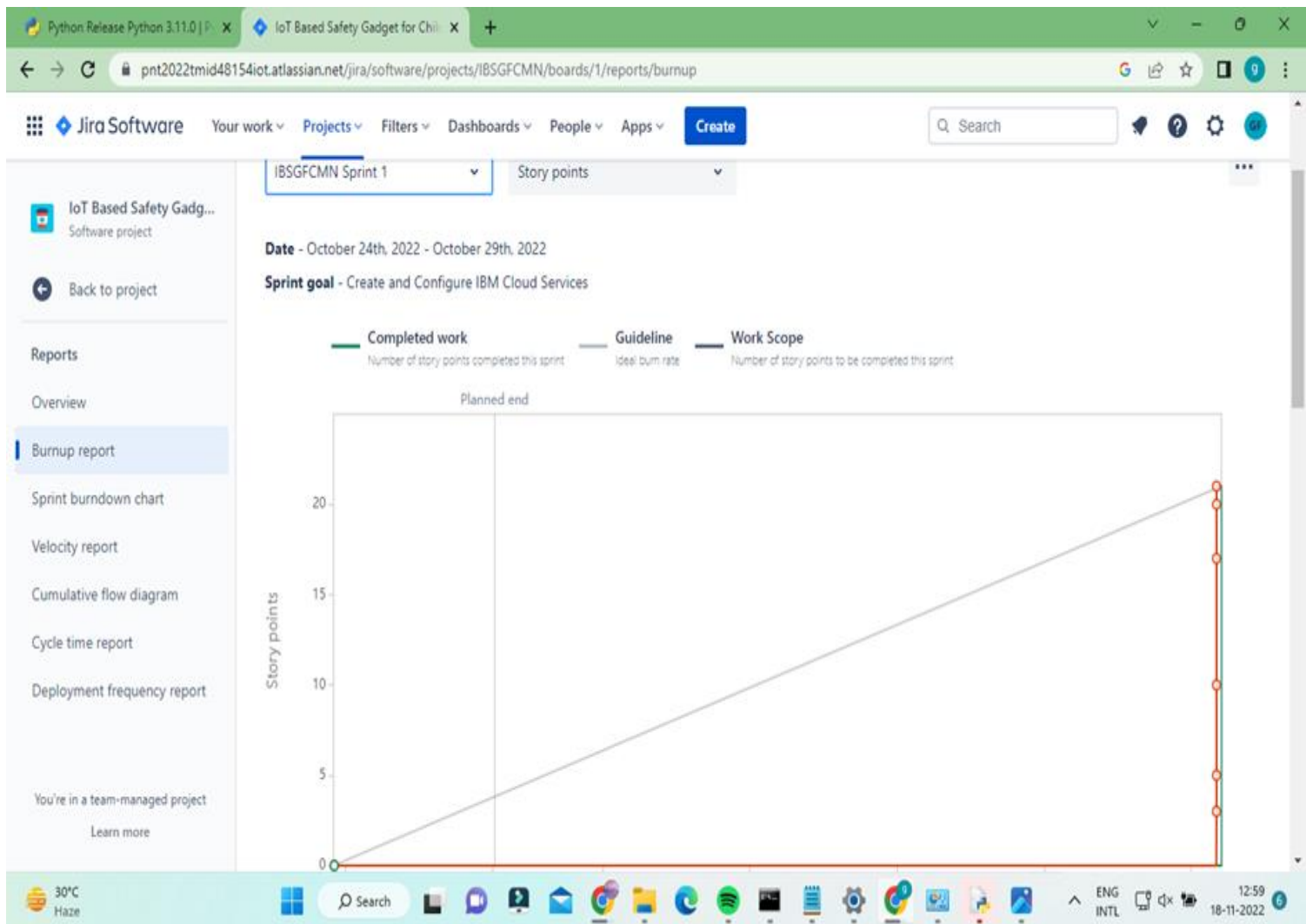
Sprint-3	22	6 Days	07 Nov 2022	12 Nov 2022	22	12 Nov 2022
Sprint-4	30	6 Days	14 Nov 2022	19 Nov 2022	30	19 Nov 2022

## 6.3 Reports from JIRA

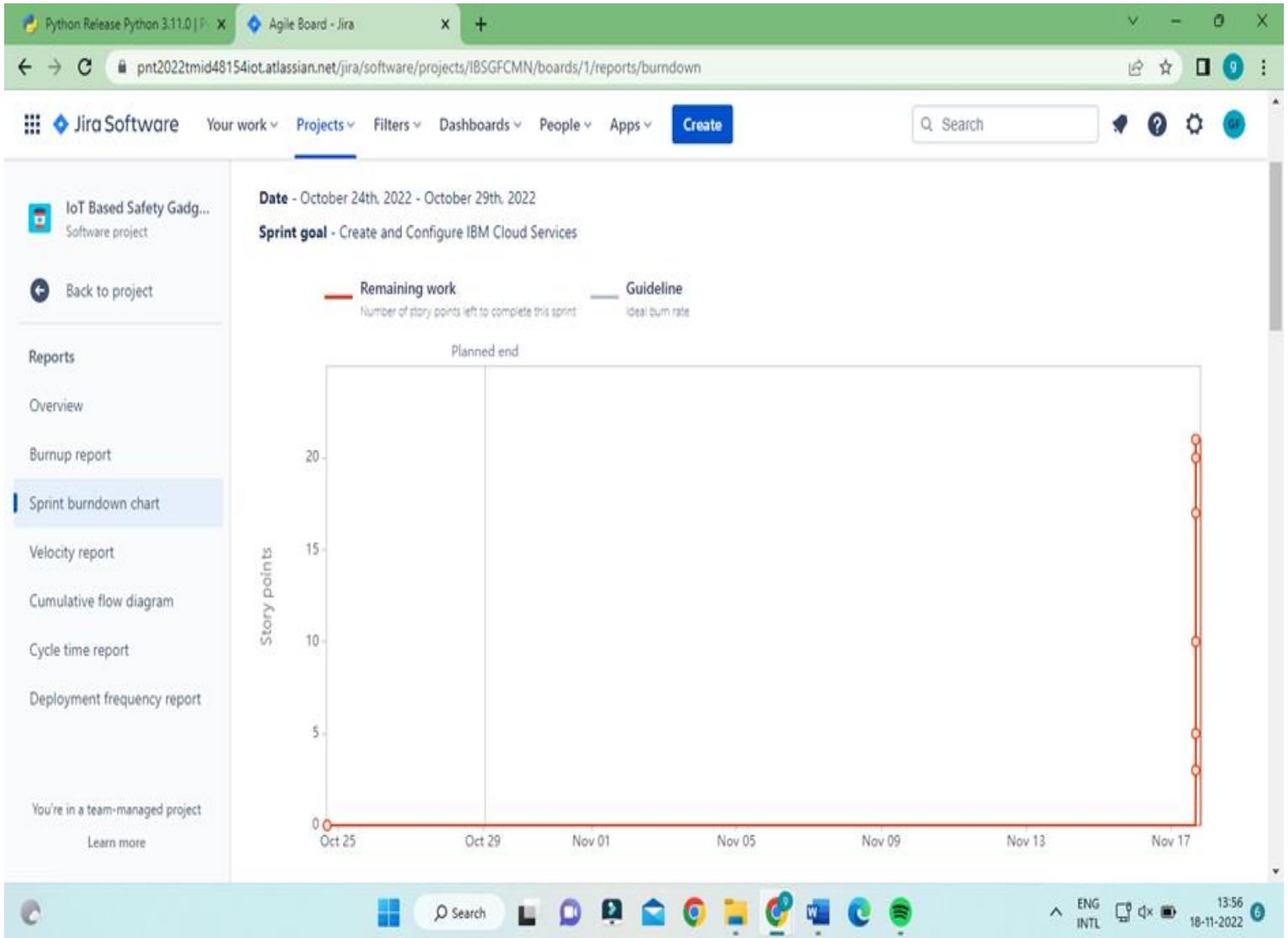
### SPRINT 1

#### ROADMAP:



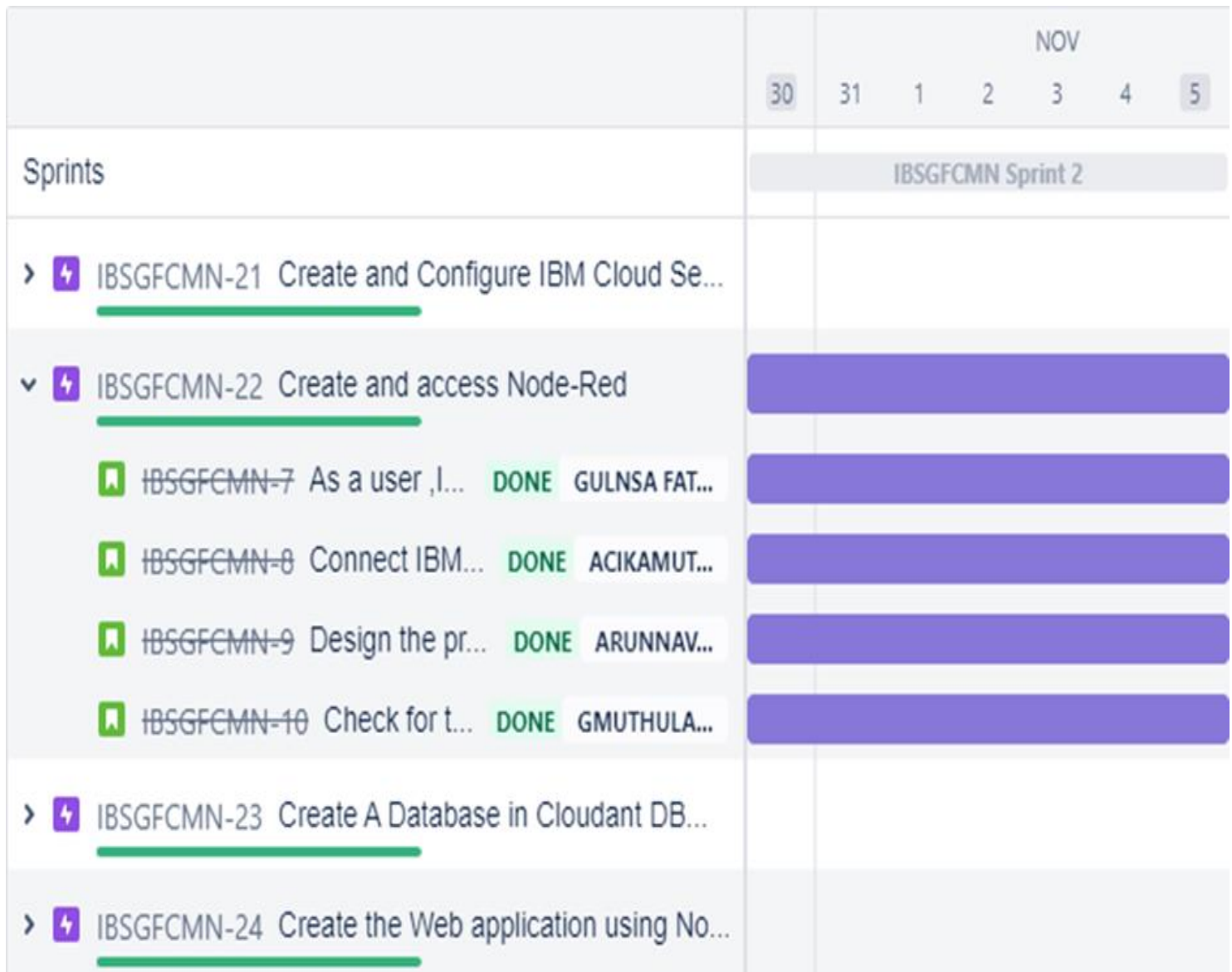


## SPRINT BURNDOWN CHART:

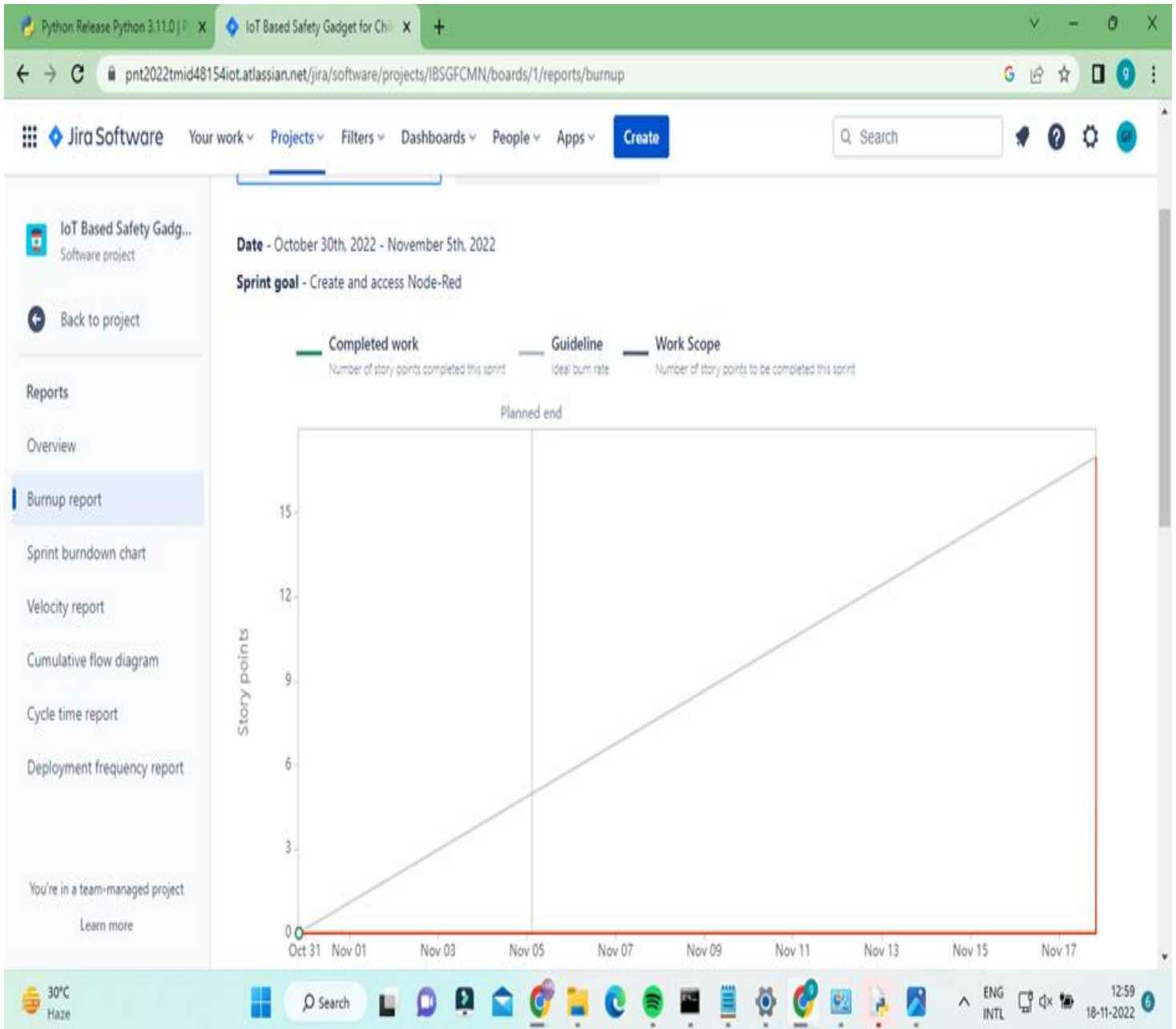


## SPRINT 2

**ROADMAP:**

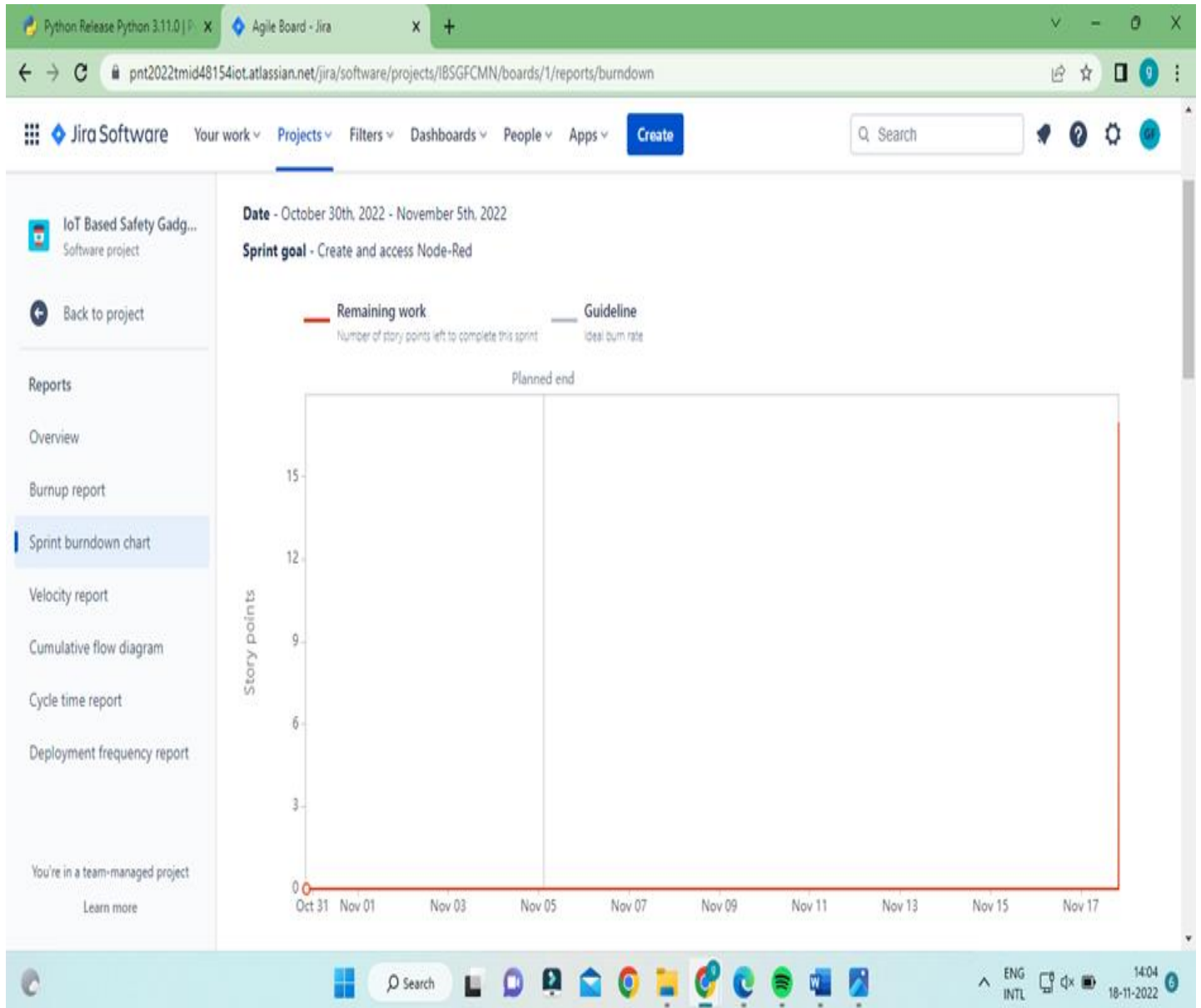


## BURNUP REPORT:












## SPRINT BURNDOWN CHART:



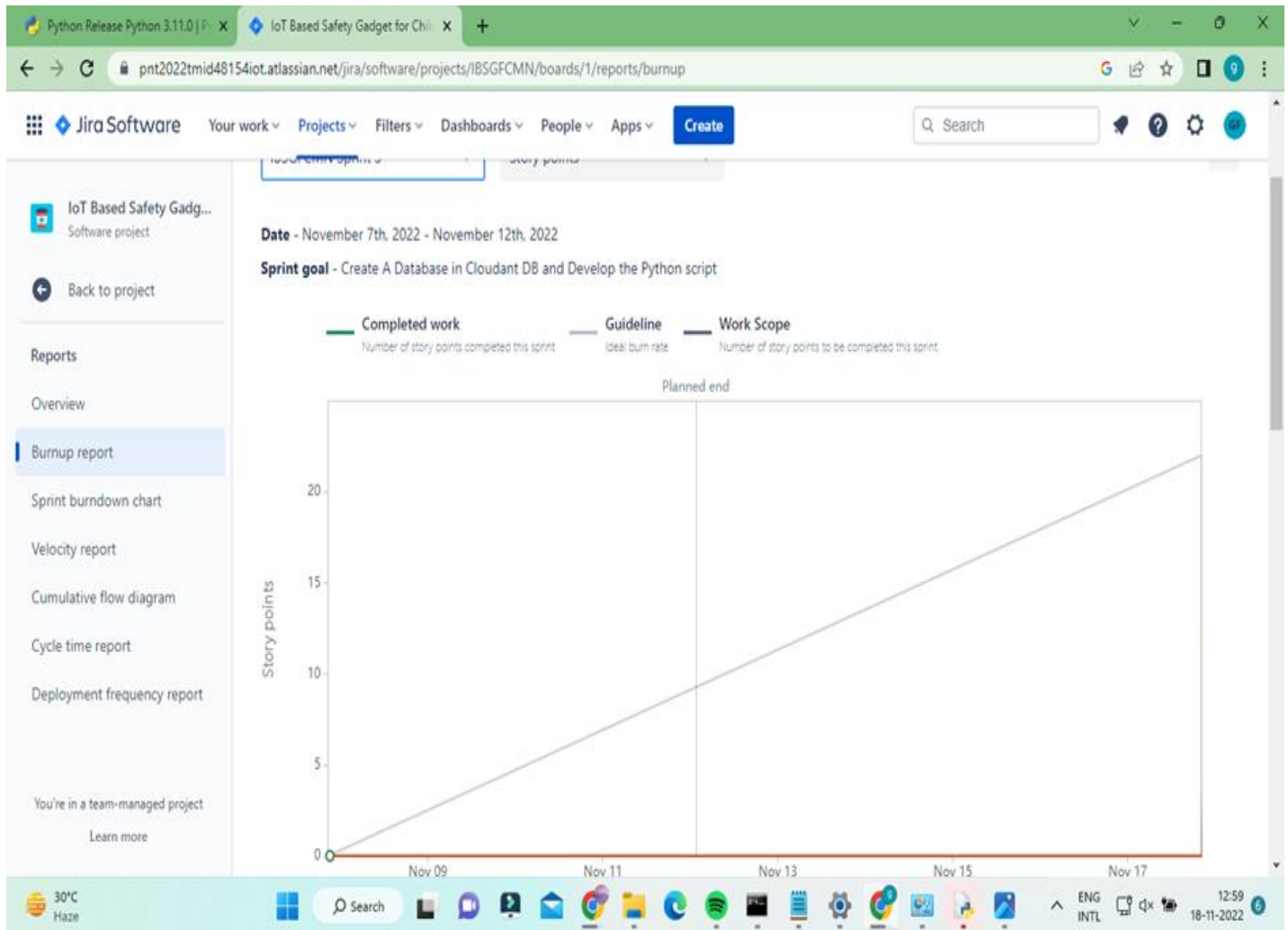


## SPRINT 3

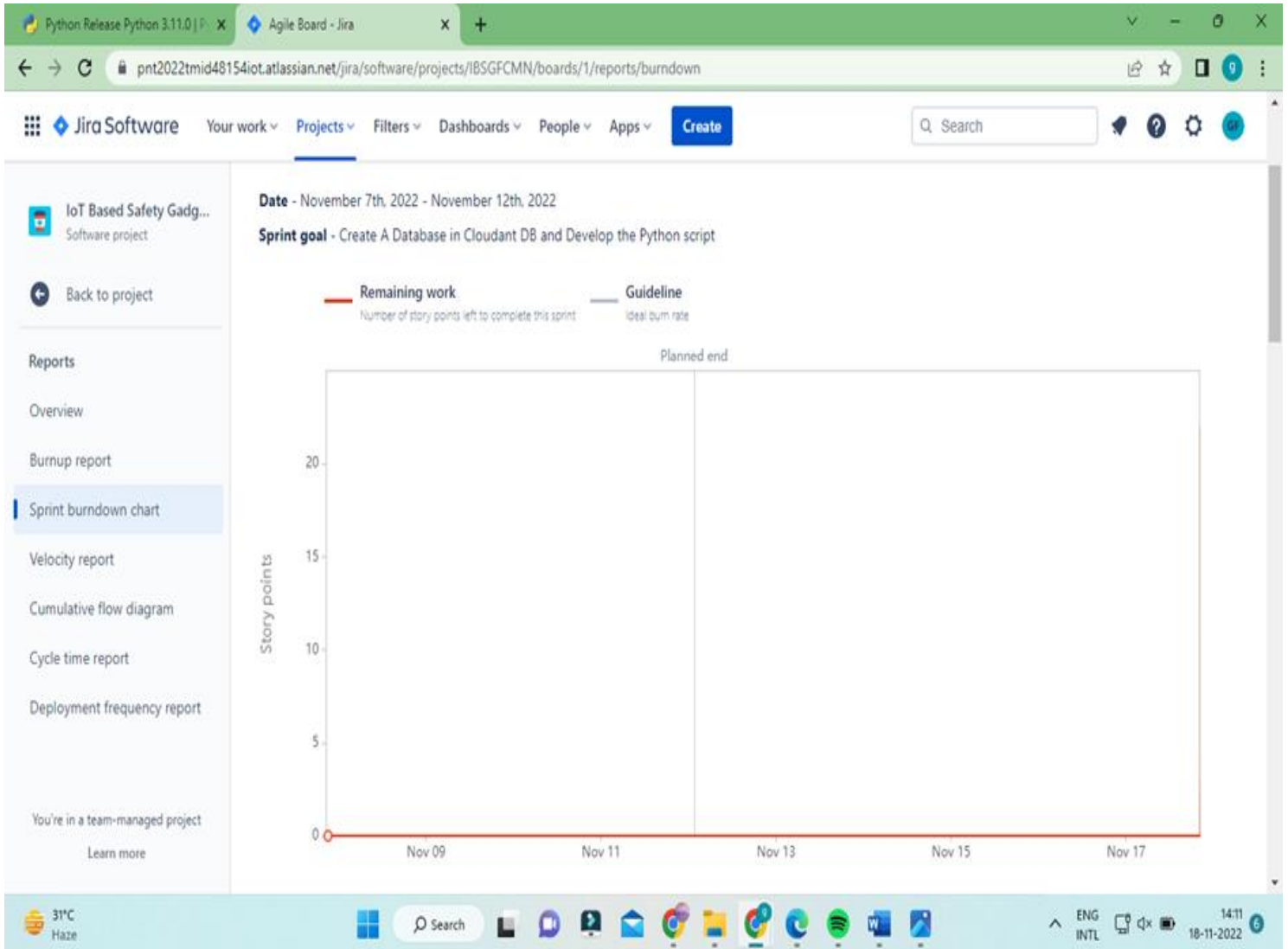
### ROADMAP:

	NOV					
	7	8	9	10	11	12
Sprints	IBSGFCMN Sprint 3					
>  IBSGFCMN-21 Create and Configure IBM Cloud Se...						
>  IBSGFCMN-22 Create and access Node-Red						
v  IBSGFCMN-23 Create A Database in Cloudbant DB...  IBSGFCMN-11 Launch the... <b>DONE</b> GULNSA FAT...  IBSGFCMN-12 Install the py... <b>DONE</b> ACIKAMUT...  IBSGFCMN-13 Develop the... <b>DONE</b> ARUNNAV...  IBSGFCMN-14 Integrate th... <b>DONE</b> GMUTHULA...  IBSGFCMN-15 Develop th... <b>DONE</b> GULNSA FAT...						
>  IBSGFCMN-24 Create the Web application using No...						

## BURNUP REPORT:



## SPRINT BURNDOWN CHART:

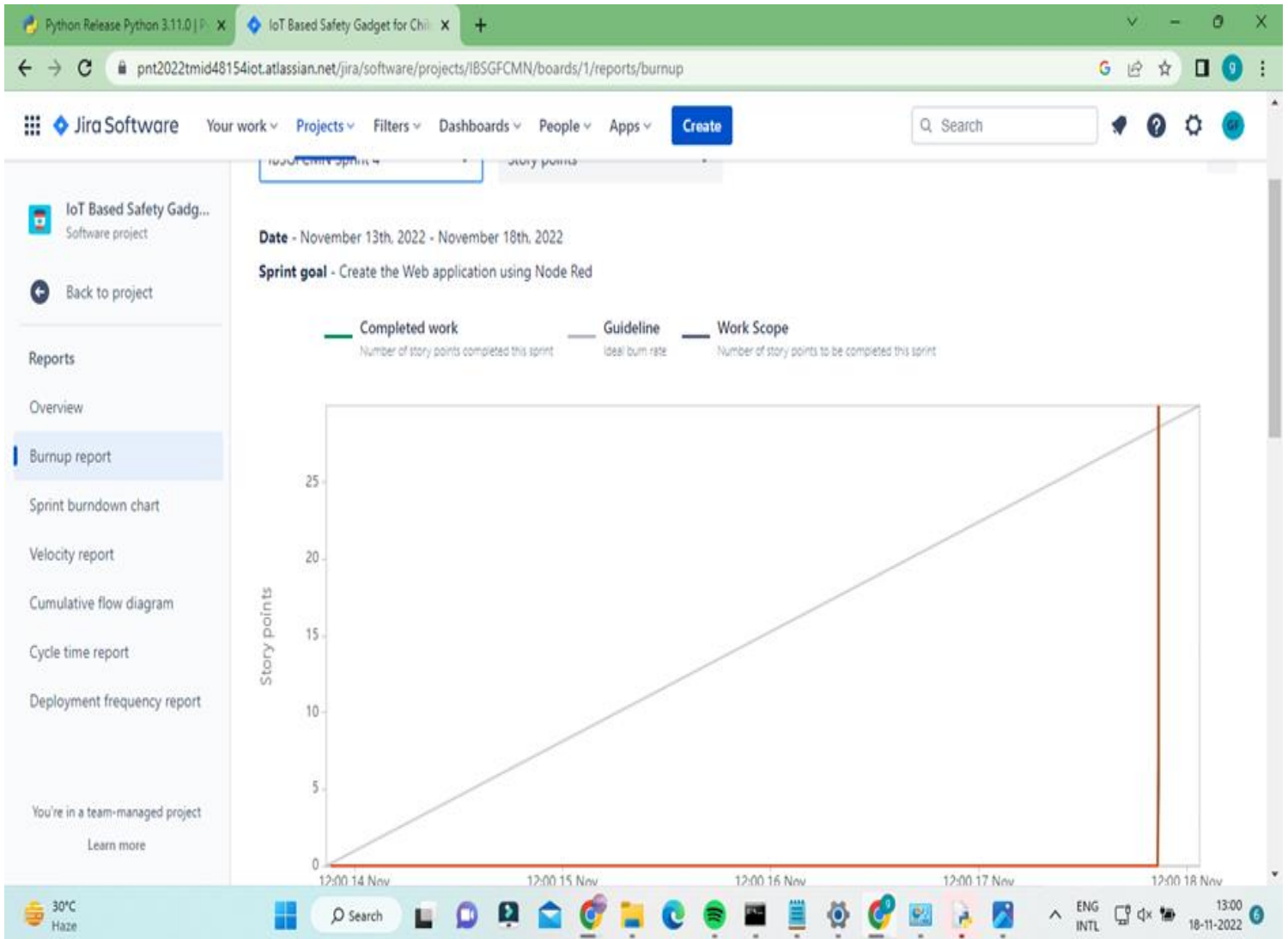


## SPRINT 4

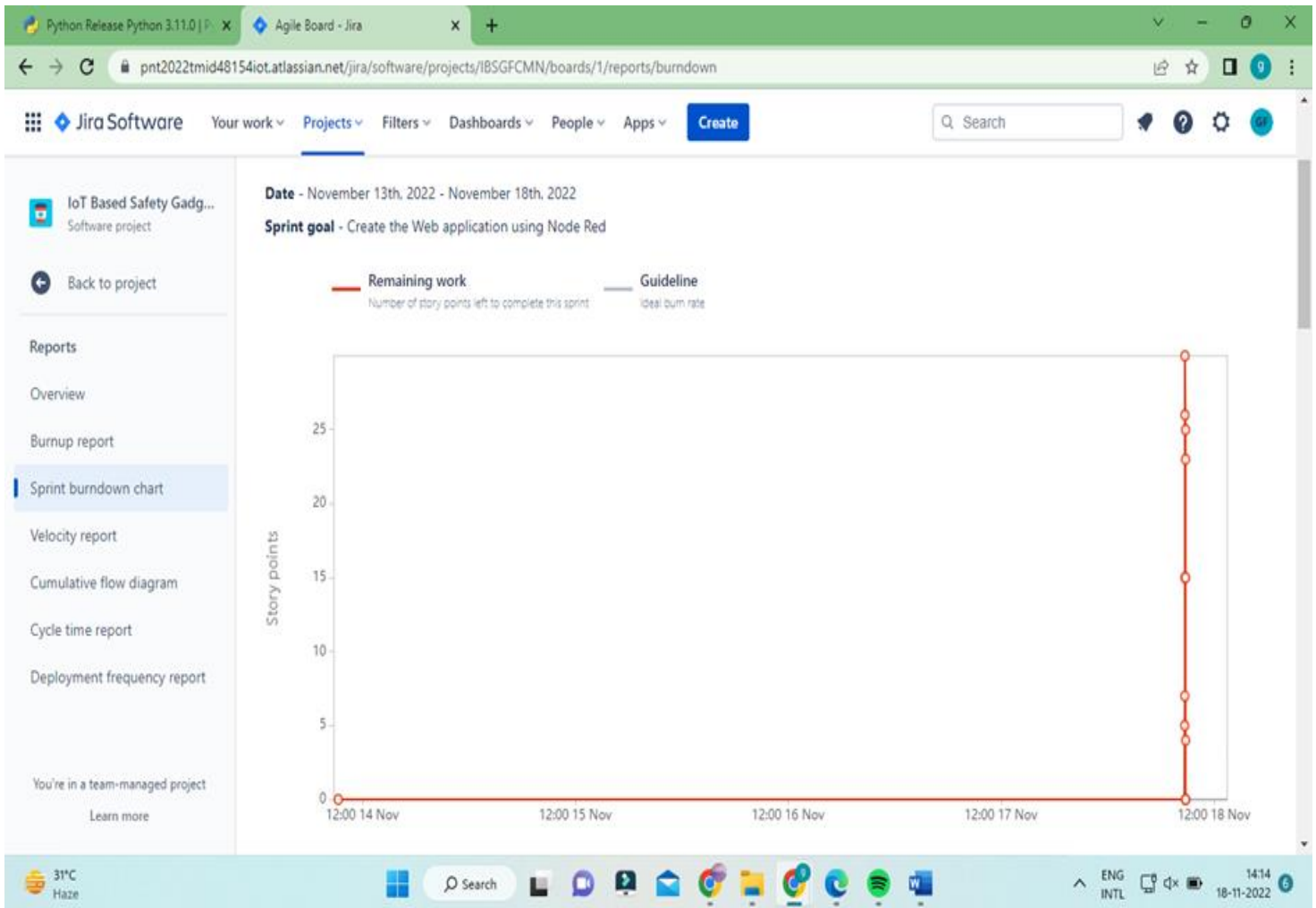
ROADMAP:

	13	14	15	16	NOV 17	18
Sprints	IBSGFCMN Sprint 4					
> ⚡ IBSGFCMN-21 Create and Configure IBM Cloud Se...						
> ⚡ IBSGFCMN-22 Create and access Node-Red						
> ⚡ IBSGFCMN-23 Create A Database in Cloudant DB...						
▼ ⚡ IBSGFCMN-24 Create the Web application using No...						
📌 IBSGFCMN-16 Develop the... DONE ACIKAMUT...						
📌 IBSGFCMN-17 Connect to t... DONE ARUNNAV...						
📌 IBSGFCMN-18 Create the g... DONE ACIKAMUT...						
📌 IBSGFCMN-19 Integrate th... DONE GULNSA FAT...						
📌 IBSGFCMN-20 Send the n... DONE GMUTHULA...						

## BURNUP REPORT:

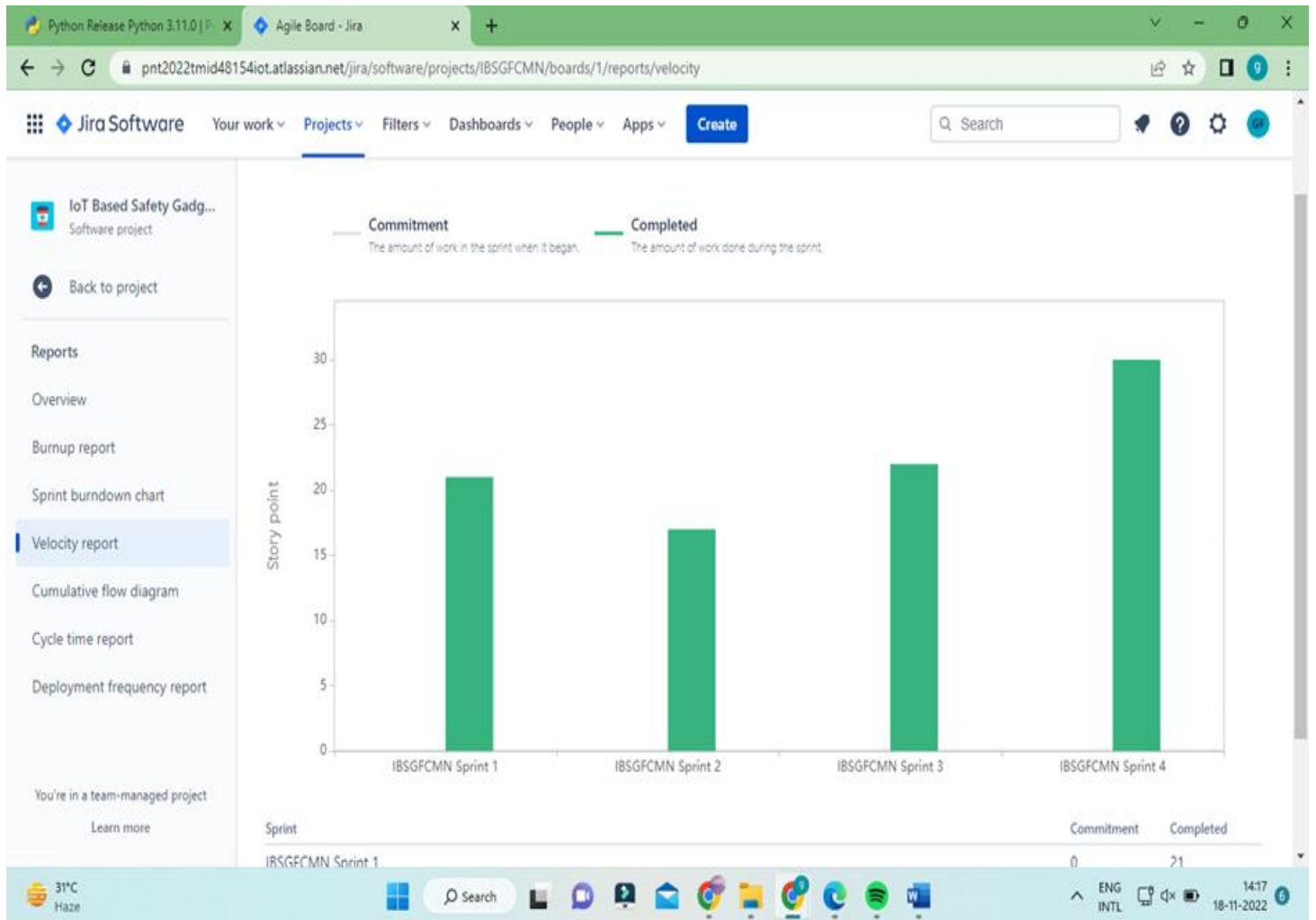


## SPRINT BURNDOWN CHART:



## VELOCITY REPORT





## OVERALL SPRINT ROAD MAP



	OCT							NOV							NOV							NOV						
	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Sprints	IBSGFCMN Sprint 1							IBSGFCMN Sprint 2							IBSGFCMN Sprint 3							IBSGFCMN Sprint 4						
▼ IBSGFCMN-21 Create and Configure IBM Cloud Se...																												
▶ IBSGFCMN-1 As a user I n... DONE GULNSA FAT...																												
▶ IBSGFCMN-2 As a user, I w... DONE ACIKAMUT...																												
▶ IBSGFCMN-3 After creating... DONE ARUNNAV...																												
▶ IBSGFCMN-4 Create the n... DONE GMUTHULA...																												
▶ IBSGFCMN-5 After Creating... DONE ACIKAMUT...																												
▶ IBSGFCMN-6 Simulate the... DONE GULNSA FAT...																												
▼ IBSGFCMN-22 Create and access Node-Red																												
▶ IBSGFCMN-7 As a user ,I... DONE GULNSA FAT...																												
▶ IBSGFCMN-8 Connect IBM... DONE ACIKAMUT...																												
▶ IBSGFCMN-9 Design the pr... DONE ARUNNAV...																												
▶ IBSGFCMN-10 Check for t... DONE GMUTHULA...																												
▼ IBSGFCMN-23 Create A Database in Cloudant DB...																												
▶ IBSGFCMN-11 Launch the... DONE GULNSA FAT...																												
▶ IBSGFCMN-12 Install the py... DONE ACIKAMUT...																												
▶ IBSGFCMN-13 Develop the... DONE ARUNNAV...																												
▶ IBSGFCMN-14 Integrate th... DONE GMUTHULA...																												
▶ IBSGFCMN-15 Develop th... DONE GULNSA FAT...																												
▼ IBSGFCMN-24 Create the Web application using No...																												
▶ IBSGFCMN-16 Develop the... DONE ACIKAMUT...																												
▶ IBSGFCMN-17 Connect to t... DONE ARUNNAV...																												
▶ IBSGFCMN-18 Create the g... DONE ACIKAMUT...																												
▶ IBSGFCMN-19 Integrate th... DONE GULNSA FAT...																												
▶ IBSGFCMN-20 Send the n... DONE GMUTHULA...																												

## 7. CODING & SOLUTIONING

### 7.1 Feature 1

1. Develop the python code for publishing the location (latitude & longitude) to IBM IoT Platform
2. Integrate the device id, authentication token in python script
3. Develop the python scripts to publish details to IBM IoT Platform

### **PYTHON CODING:**

```
import json
import wiotp.sdk.device
import time

myConfig = {
    "identity":{
        "orgId":"2a6zb4",
        "typeId":"NodeMCU",
        "deviceId":"12345"
    },
    "auth": {
        "token":"12345678"
    }
}

client = wiotp.sdk.device.DeviceClient(config = myConfig,
logHandlers = None)
client.connect()
while True:
    name="smartbridge"
    #in area location
```

```

#latitude= 17.42225176
#longitude= 78.5458842

#out area location

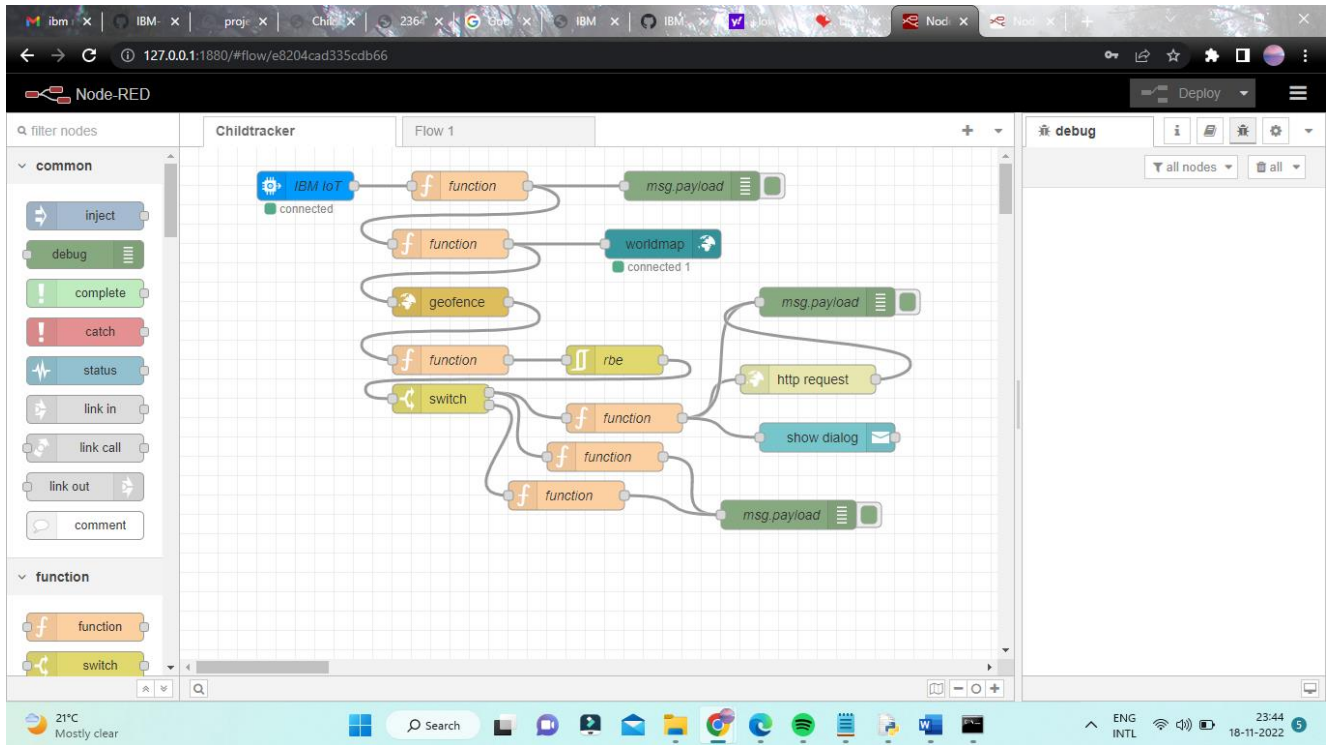
latitude= 17.42225176
longitude= 78.5458842
myData={'name': name, 'lat':latitude, 'lon':longitude}
client.publishEvent(eventId="status", msgFormat="json",
data=mydata, qos=0, onPublish=None)
print("Data published to IBM IoT platform:",myData)
time.sleep(5)

client.disconnect()
#CONNECTED TO IBM IOT CLOUD
myConfig = {
    "identity":{
        "orgid":"2a6zb4",
        "typeId":"NodeMCU",
        "deviceId":"12345"
    },
    "auth": {
        "token":"12345678"
    }
}

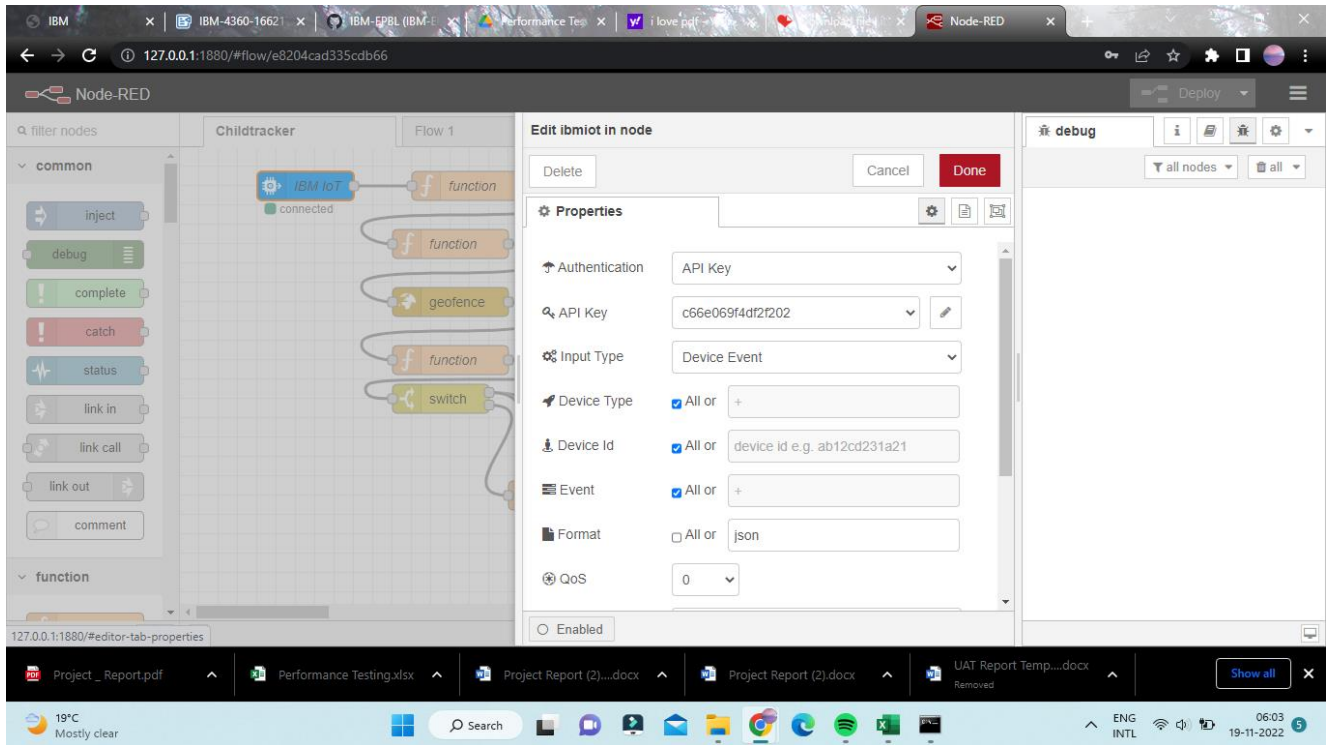
```

## 7.2 Feature 2

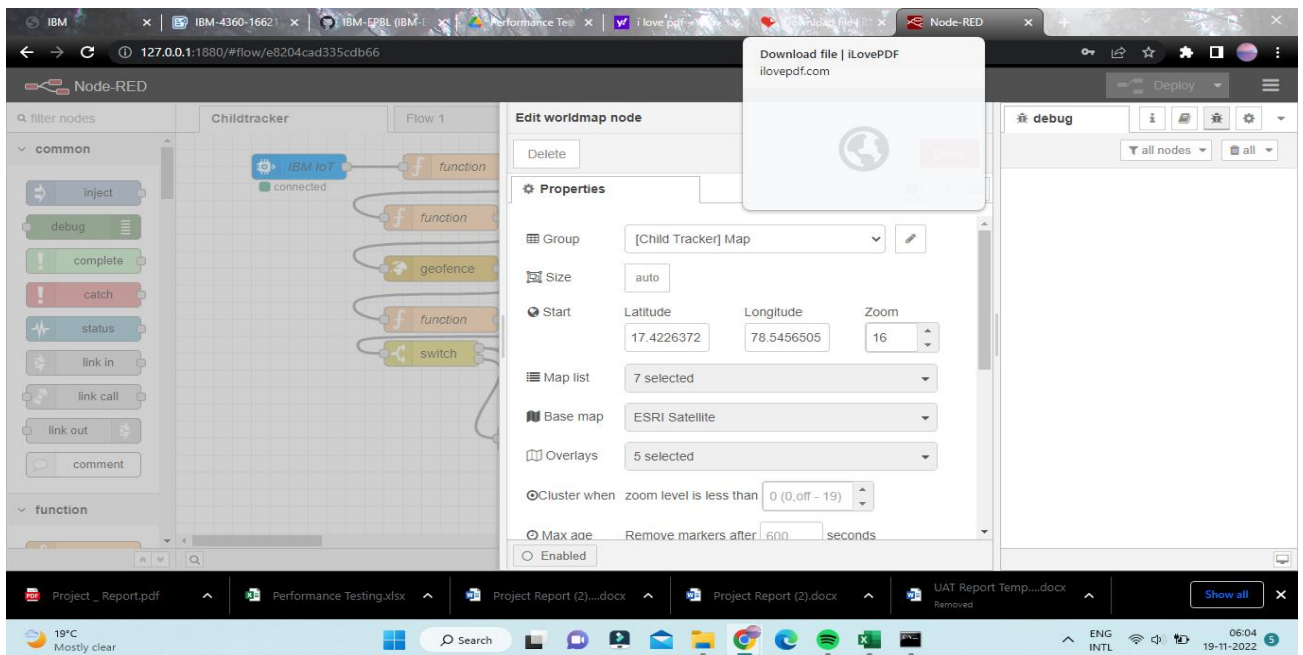
1. Created node-red flow using worldmap, geofence, cloudant, and http request to locate the child.



2. Connected IBM IoT node in node-red to IBM Watson IoT using device credentials.

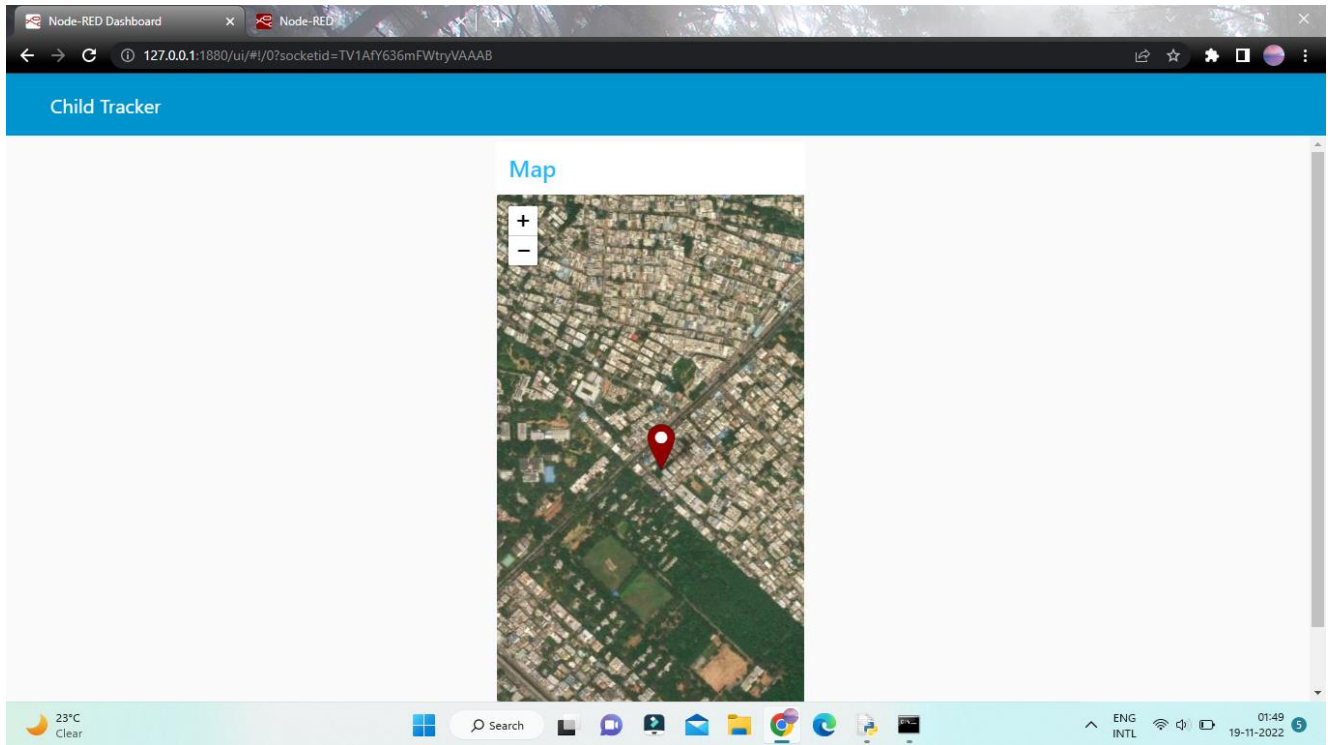


3. Created worldmap\_ui to show the child location in user interface page of node-red



4. Connected geofence to keep the child safe inside the parent or caretaker's monitoring  
# in area location





**# out area location**

```
python1.py - C:\Python\Python37\python1.py (3.7.0)
File Edit Format Run Options Window Help

import json
import wiotp.sdk.device
import time

myConfig = {
    "identity": {
        "orgId": "2a6zb4",
        "typeId": "NodeMCU",
        "deviceId": "12345"
    },
    "auth": {
        "token": "12345678"
    }
}

client = wiotp.sdk.device.DeviceClient(myConfig)

client.connect()
while True:
    name = "smartbridge"
    # in area location

    # latitude = 17.42225176
    # longitude = 78.5458842

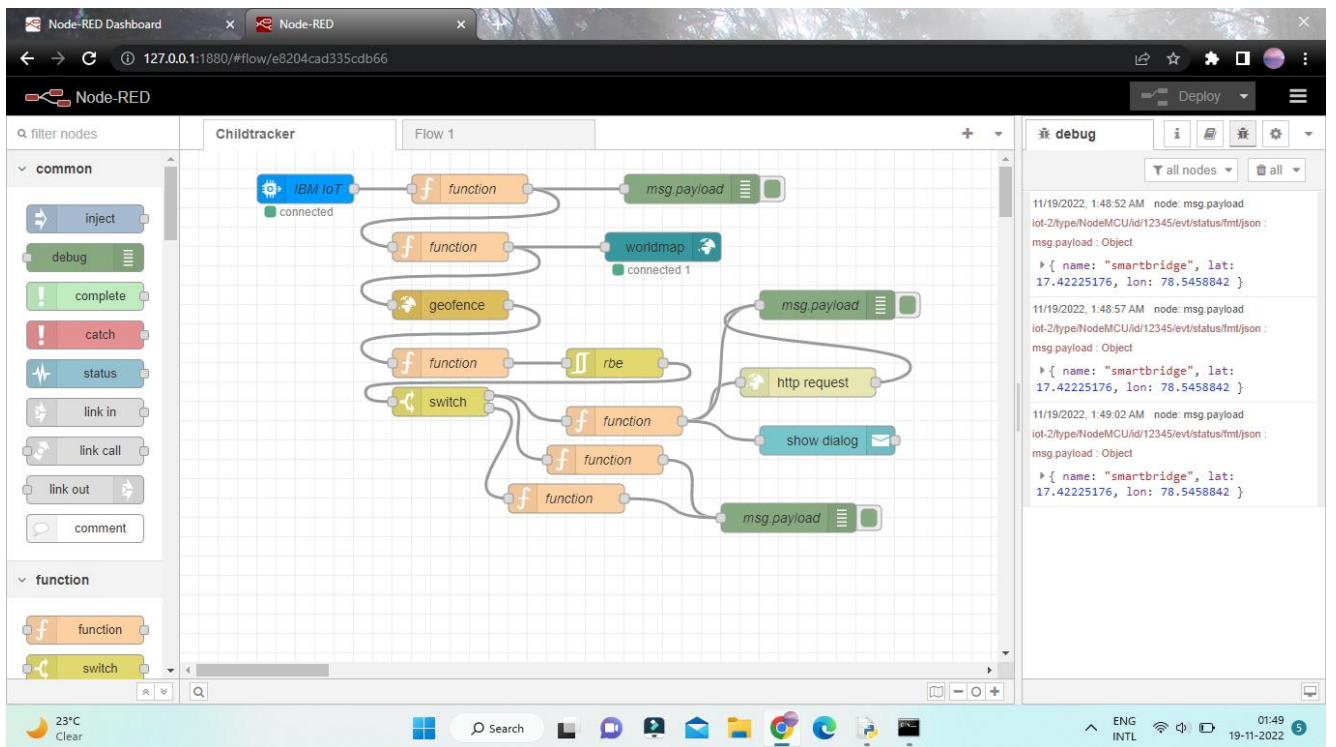
    # out area location

    latitude = 17.42225176
    longitude = 78.5458842
    myData = {'name': name, 'lat': latitude, 'lon': longitude}
    client.publishEvent(myData)
    print("Data published to IBM IoT platform: {}".format(myData))
    time.sleep(5)

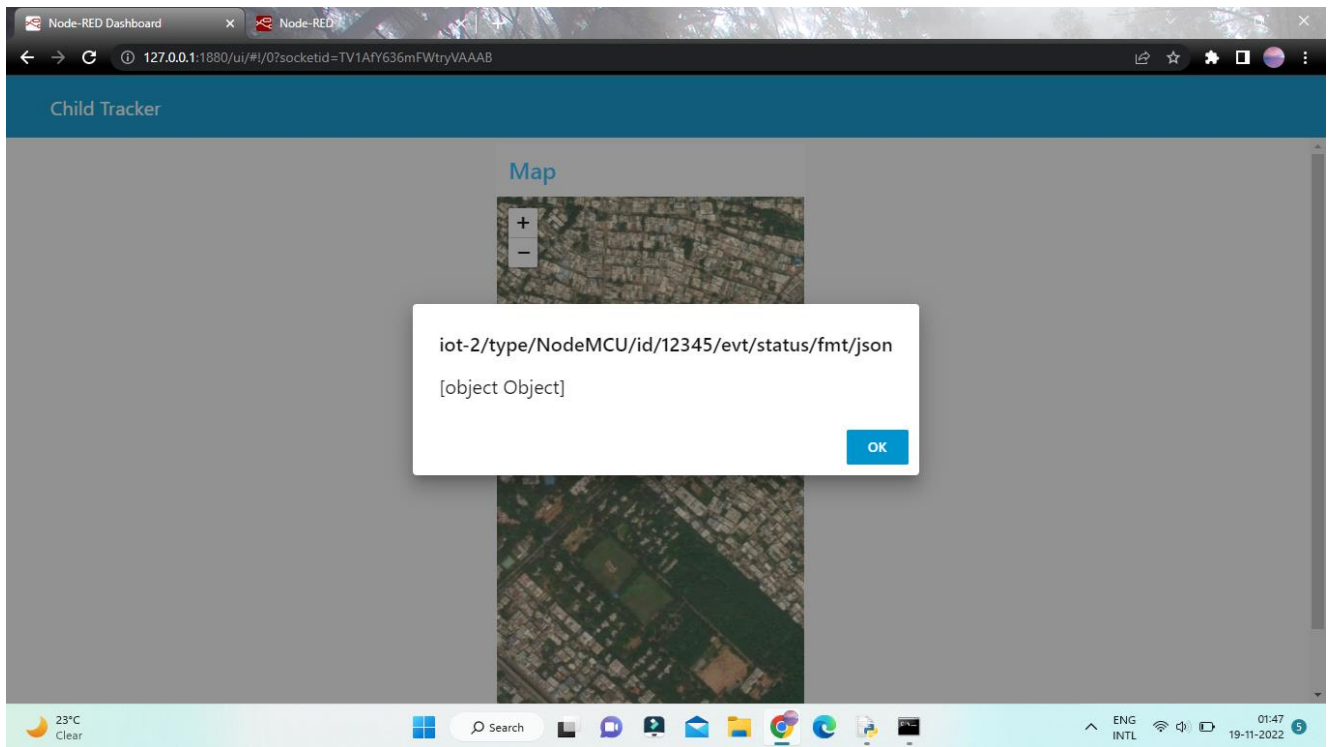
client.disconnect()
```

```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help

Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Python\Python37\python1.py =====
2022-11-19 01:48:26,338 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:2a6zb4:NodeMCU:12345Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
```







## 8.TESTING

## 8.1 Test Cases

Count	Inputs	Outputs	Results
1	Latitude:17.4219272 Longitude:78.5488783	Parents can view the child's location in the application.	Normal condition
2	Latitude: 17.5442272 Longitude:78.7687831	Parents can view the child's location in the application.	Normal condition
3	Latitude:30.4219272 Longitude:108.5488783	Parents can view the child's location in the application and also alert message sent and data stored in cloud.	Critical condition
4	Latitude:17.0987654 Longitude:78.6542789	Parents can view the child's location in the application.	Normal condition
5	Latitude:60.8376428 Longitude:190.6524781	Parents can view the child's location in the application and also alert message sent and data stored in cloud.	Critical condition

## 8.2 User Acceptance Testing

**Purpose of Document:**

The purpose of this document is to briefly explain the test coverage and open issues of the IoT Based Safety Gadget for Child Safety Monitoring & Notification project at the time of the release to User Acceptance Testing (UAT).

### Defect Analysis:

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	1	0	1	1	3
Won't Fix	0	0	0	1	1
Totals	25	9	11	26	149

### Test Case Analysis:

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7

Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	4	0	4
Version Control	2	0	0	2

## 9. RESULTS

This project that IoT Based Safety Gadget for Child Safety Monitoring & Notification used to tracking the child location and send the information to the parent.By using IBM Cloud

### 9.1 Performance Metrics

#### CPU usage:

- The Python V3.7.0 is make the best use of the CPU. For every loop the program runs in O(1) time, neglecting the network and communication. The program sleeps

for every 1 second for better communication with MQTT. As the program takes  $O(1)$  time and the compiler optimizes the program during compilation there is less CPU load for each cycle. The upcoming instructions are on the stack memory, so they can be popped after execution.

**Garbage collection:**

- In the server-side garbage collection is done by the Node framework. In the IoT device, python does not have any garbage collection features. But it is not necessary in this scenario as the memory is used again for storing the data. Any dangling pointer or poorly handled address space is not allocated.

**Memory usage:**

- It uses less memory space, for storing data in database of the cloudant. And more access the data from the database

## 10. ADVANTAGES & DISADVANTAGES

**Advantages:**

- Application automatically operates location requests without user interaction because at that time child not have knowledge to update his location at map.
- Deliver exactly what the customer wants.
- That application uses SMS when internet connectivity is not available. The system requires location and telephony services.
- Easy Availability & Affordability.
- Tracking Made Easy.

- Smart watch is Technology in Disguise.
- Watch over your kids.
- Track kids when they are away from home and out of your sight.

**Disadvantages:**

- Data security concerns.
- Technical concerns.
- The child could not produce the exact alert command during a panic situation.
- The command produced may not match with the previously stored command.
- So, this may fails to send the notification to child's parents.
- . Capabilities are limited.

## 11. CONCLUSION

In the conclusion of project was designed for the locating missing children. This project was given depth information about child tracking system with the help of geofence and SMS services the application is built in. Finally for this application has room for the enhancement. Emergency alerts such features can be added to enhance system. Parents especially who live in urban area, needed to work day and night to sustain the family which causes them cannot know where their child is going during the working hour. However, with the child tracking app, parent can track and monitor their child with just a simple app. The parent is not possible to always stay beside of children as most of the parents needs to go for work. By having this child tracking system, parents can track the location of their children. In order to avoid the kidnapping cases, the child tracking system is needed. This

project demonstrates Smart IoT device for child safety and tracking which will help the parents to locate and monitor their children. If the child crosses the geofence the notifications are sent to the parents or caretakers. Our project is easy for parents to track their children which ensures the safety of their children.

## **12. FUTURE SCOPE**

This system requires proper network connectivity. The system won't work if there is no internet connection. Hence in the future, these issues can be overcome by accessing the system without internet and using high-speed server transmission. Also, we would like to include some advanced authentication mechanism. The proposed system will be improved in the later work.

## 13. APPENDIX

### Source Code

#### **PYTHON CODING:**

```
import json
import wiotp.sdk.device
import time

myConfig = {
    "identity":{
        "orgId":"2a6zb4",
        "typeId":"NodeMCU",
        "deviceId":"12345"
    },
    "auth": {
        "token":"12345678"
    }
}
```



```

    }
    client = wiotp.sdk.device.DeviceClient(config = myConfig, logHandlers = None)
client.connect()
while True:
    name="smartbridge"
    #in area location

    #latitude= 17.42225176
    #longitude= 78.5458842

    #out area location

    latitude= 17.42225176
    longitude= 78.5458842
    myData={'name': name, 'lat':latitude, 'lon':longitude}
    client.publishEvent(eventId="status", msgFormat="json", data=mydata,
qos=0, onPublish=None)
    print("Data published to IBM IoT platform:",myData)
    time.sleep(5)

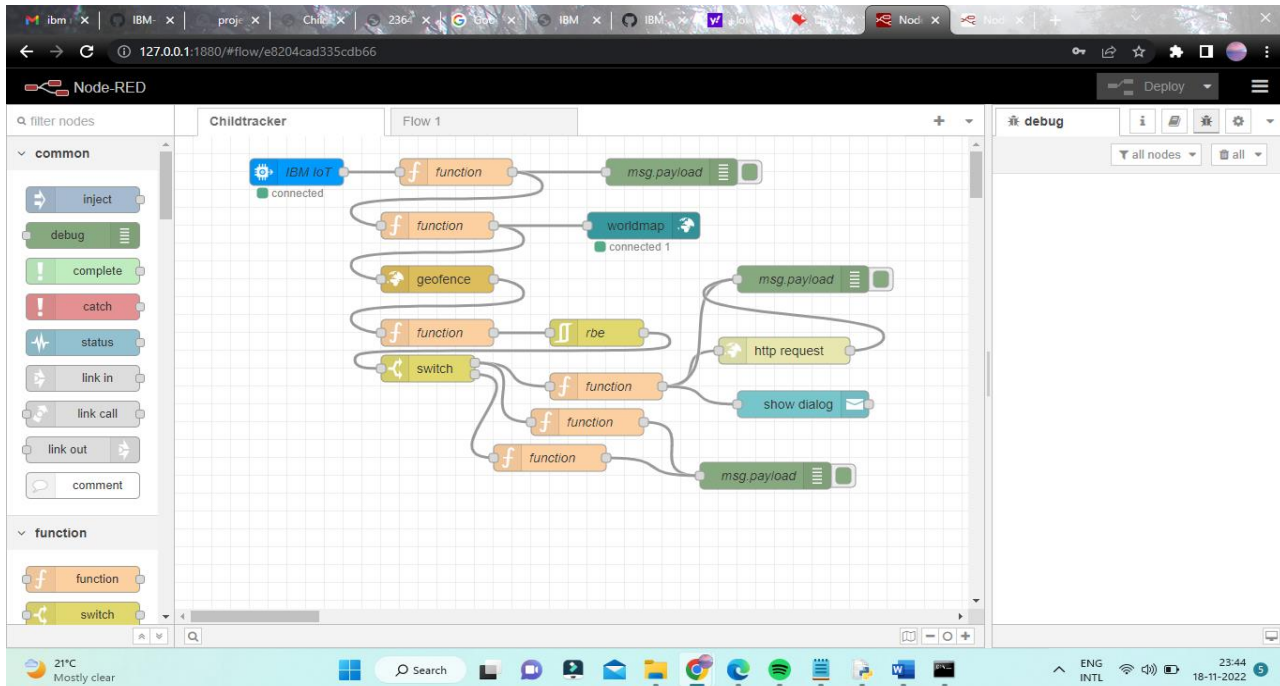
client.disconnect()
#CONNECTED TO IBM IOT CLOUD
    myConfig = {
    "identity":{
        "orgid":"2a6zb4",
        "typeId":"NodeMCU",
        "deviceId":"12345"
    },

```

```
"auth": {  
  "token": "12345678"  
}
```

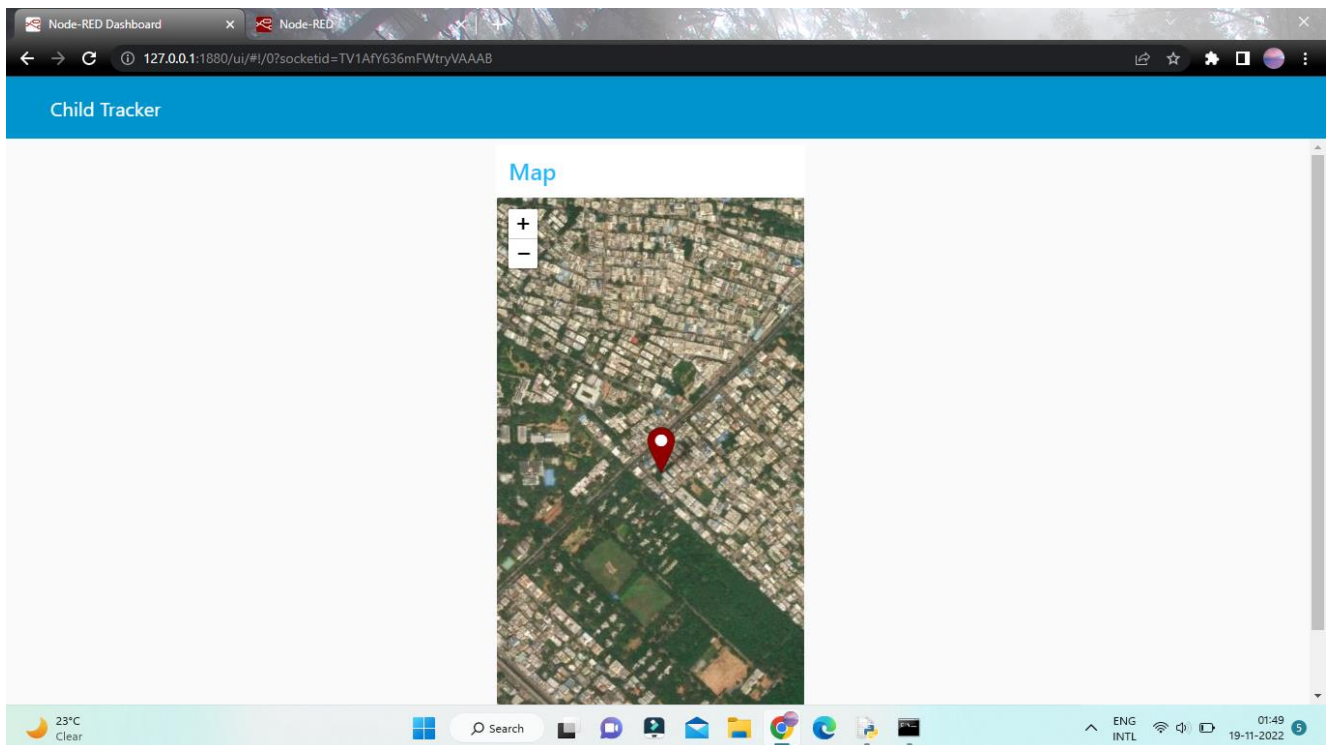
## OUTPUT SCREENSHORT:

# In  
area



location





60

```
python1.py - C:\Python\Python37\python1.py (3.7.0)
File Edit Format Run Options Window Help

import json
import wiotp.sdk.device
import time

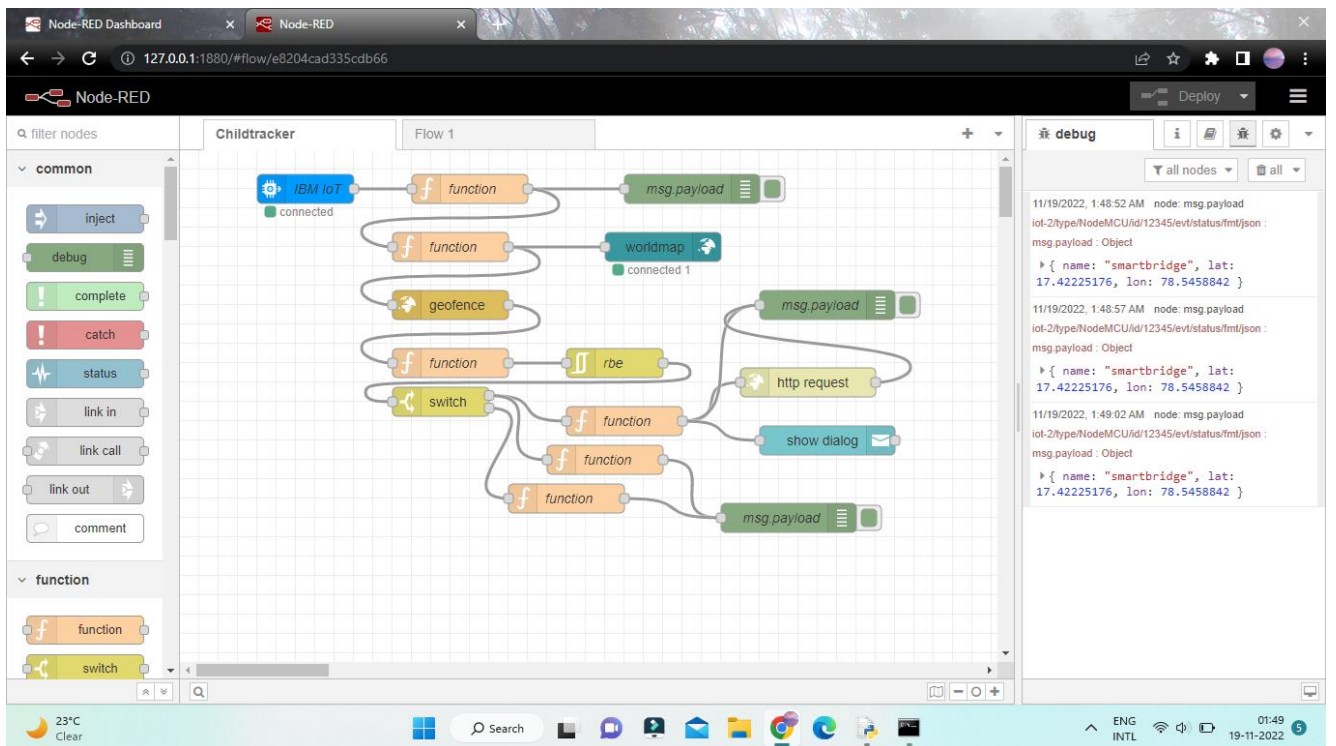
myConfig = {
    "identity": {
        "orgId": "2a6zb4",
        "typeId": "NodeMCU",
        "deviceId": "12345"
    },
    "auth": {
        "token": "12345678"
    }
}

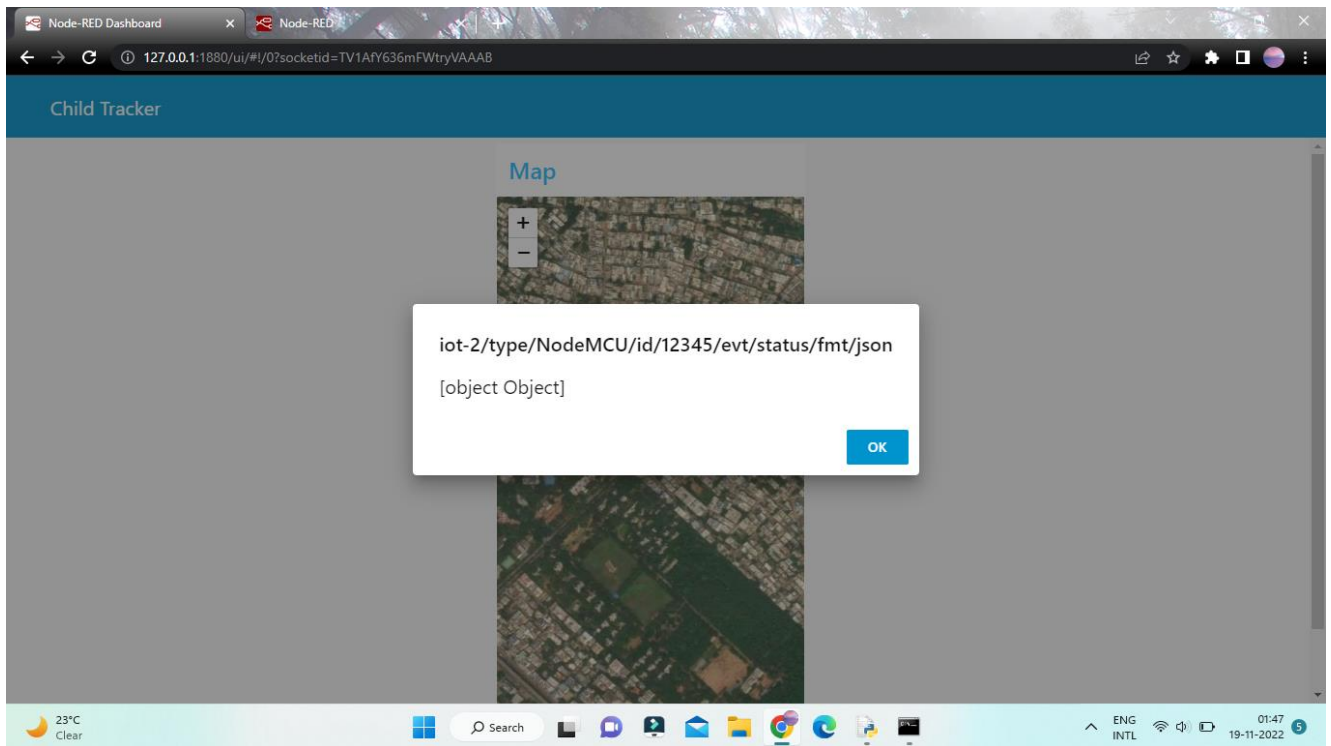
client = wiotp.sdk.device.DeviceClient(myConfig)
client.connect()
while True:
    name = "smartbridge"
    # in area location
    # latitude = 17.42225176
    # longitude = 78.5458842

    # out area location
    latitude = 17.42225176
    longitude = 78.5458842
    myData = { "name": name }
    client.publishEvent(myData)
    print("Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}")
    time.sleep(5)

client.disconnect()
```

```
Python 3.7.0 Shell
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Python\Python37\python1.py =====
2022-11-19 01:48:26,338 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:2a6zb4:NodeMCU:12345Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
Data published to IBM IoT platform: {'name': 'smartbridge', 'lat': 17.42225176, 'lon': 78.5458842}
```





**GitHub & Project Demo Link:**

**GitHub:**<https://github.com/IBM-EPBL/IBM-Project-4360-1658729689>

[IBM-Project-4360-1658729689](https://github.com/IBM-EPBL/IBM-Project-4360-1658729689)

**Project Demo**

**Link:**[file:///C:/Users/jalban/Videos/Movavi%20Screen%20Recorder/ScreenRecorderProject1\\_1.mp4](file:///C:/Users/jalban/Videos/Movavi%20Screen%20Recorder/ScreenRecorderProject1_1.mp4)









